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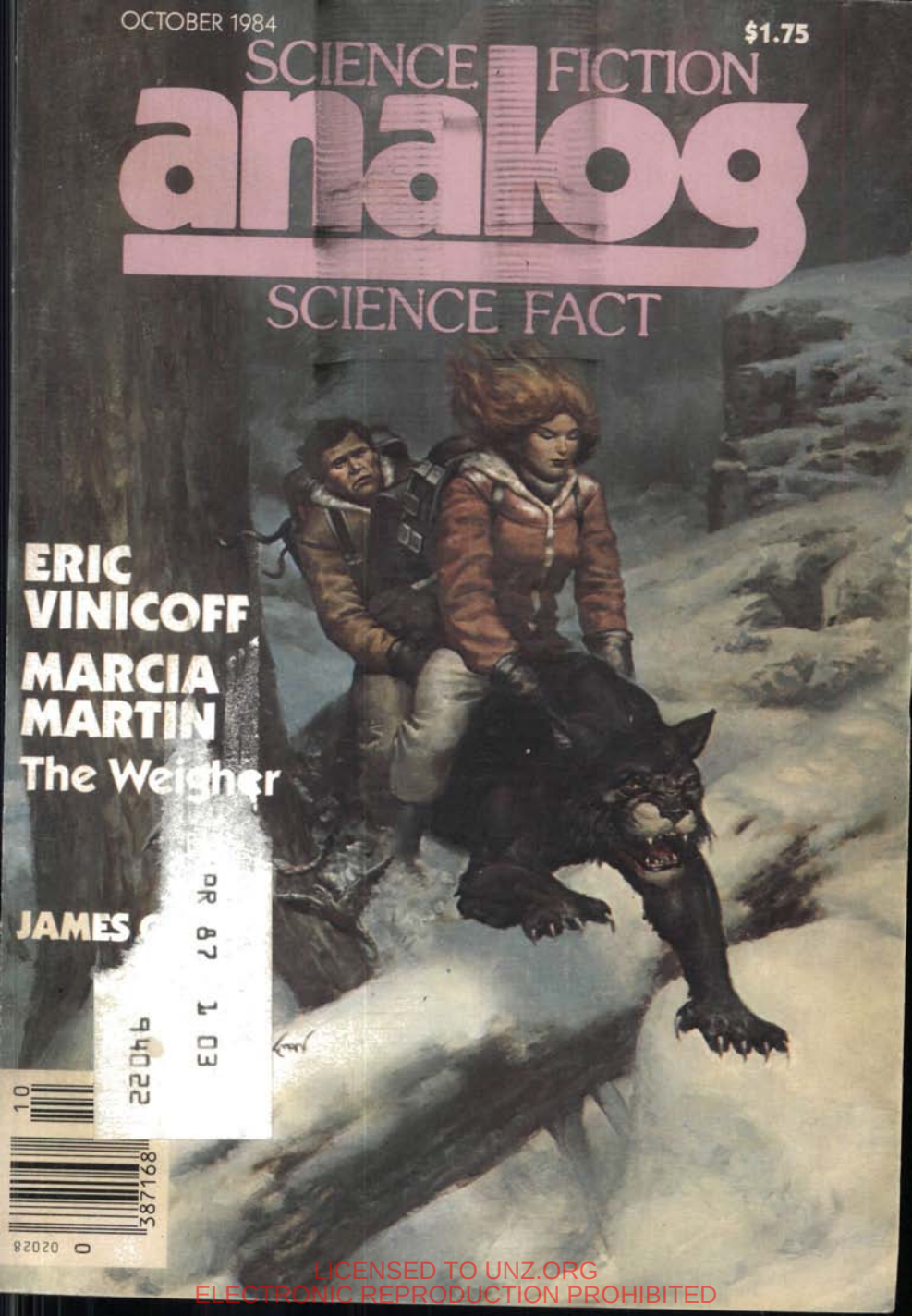

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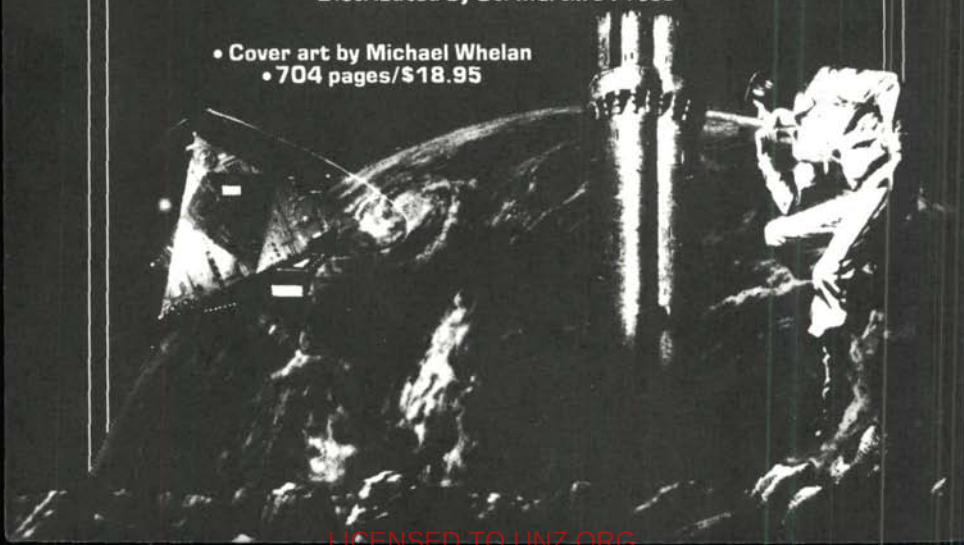

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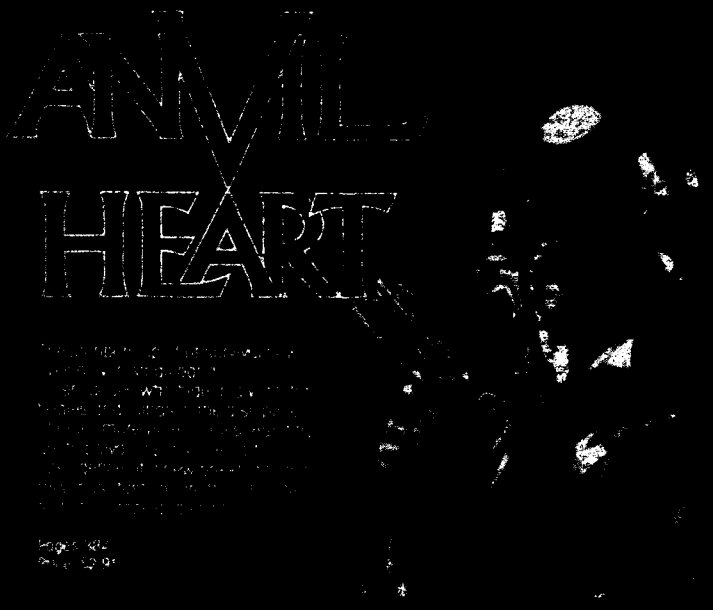

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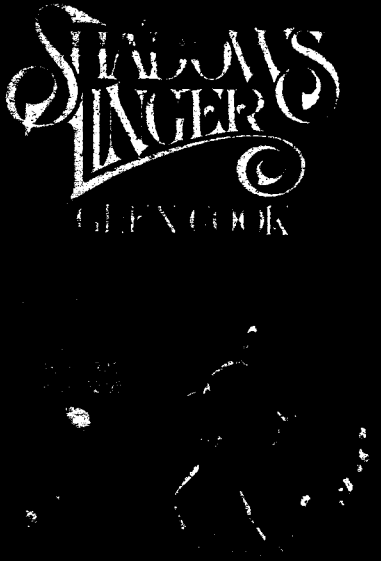

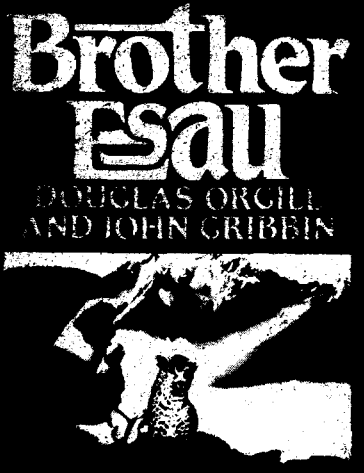

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Editorial

THE TOO-INCLUSIVE "WE"

Stanley Schmidt

I have often mused, without reaching a definite conclusion, on which is more remarkable: that human beings use such imprecise languages to talk to each other, or that they manage to communicate as much as they do in spite of the imprecision of the tools. Consider, for example, the simple little word *we*. In English at its most straightforward, *we* is a plural pronoun referring to some group whose identity is presumably clear from context. It always includes the speaker but may or may not include the person addressed. This can create some awkwardness—if I am with a friend and tell you, "We're going to dinner now and I'm buying," are you invited or aren't you? Some languages, such as the Polynesian group, avoid such ambiguities by having separate "inclusive" and "exclusive" pronouns. In such a language, it would take real effort to leave you uncertain whether to tag along.

That's what a linguist means when he talks about inclusive or exclusive *we* in a language like Hawaiian. But we have our own problems with linguistic inclusivity—not just ambiguity of the type in that example, but a wide range of casual inaccuracy and inconsistency about how big a group "we" refers to and who is in it. At one extreme, kings (and editors) sometimes refer to *themselves*, singularly, as "we"; the speaker is certainly included, but there's real doubt that anybody else is (except perhaps some dream-figure to which the royal personage wishes he could pass

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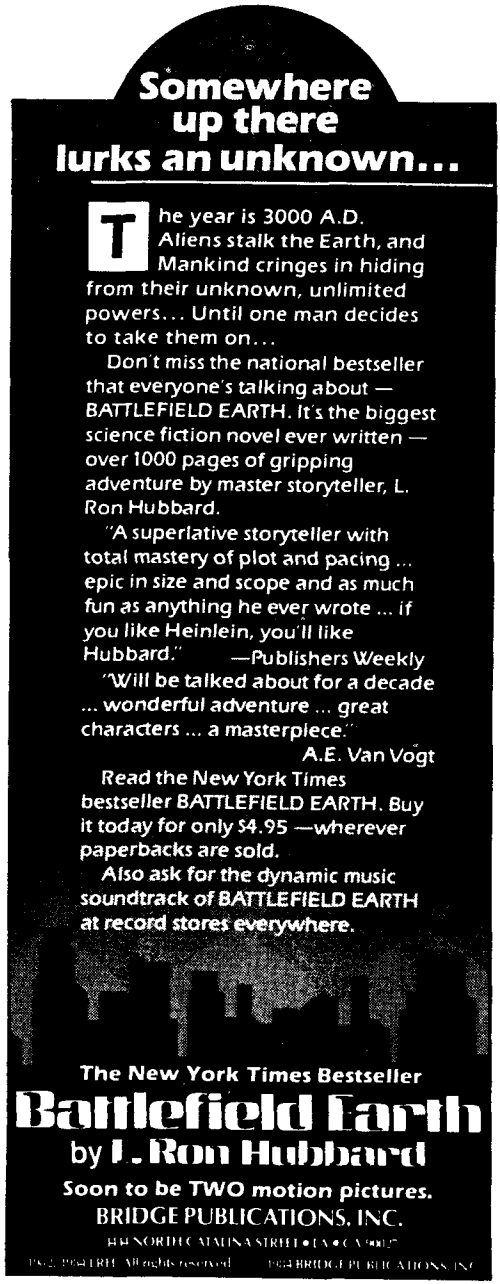
an occasional buck). At the other extreme, thousands of sports fans quite commonly boast of how "we" won a game that was played miles away by a handful of individuals who wouldn't know the speaker from Adam. In no real sense is the speaker in this case part of the group that won the game, but he chooses a word that implies he is—for psychological reasons on which you can speculate as well as I.

This may seem a pedantic quibble over a harmless and generally accepted practice (schools overtly encourage it at pep rallies and such), and that may be all it is, at least sometimes. (Though I've seen some near-riots at high school football games that make me wonder. . . .) The trouble is, unless people give a lot more thought than most usually do to precisely what they mean by the words they use, they may unwittingly come to believe more of the implied connotations than they originally intended to. A student who has never set foot on a football field and does not aspire to, may come to feel that he really does in some sense deserve credit or blame for the fortunes of the team.

And virtually anyone may come to accept as unassailable fact such assertions as, "We are a warlike species" or "We are on the verge of racial suicide."

I have heard both of those statements put forth on a great many occasions, often in a way that made it quite clear that the speaker meant them not only quite seriously, but very literally. "Man is a warlike animal" was taken as a Fundamental Truth whose exact signif-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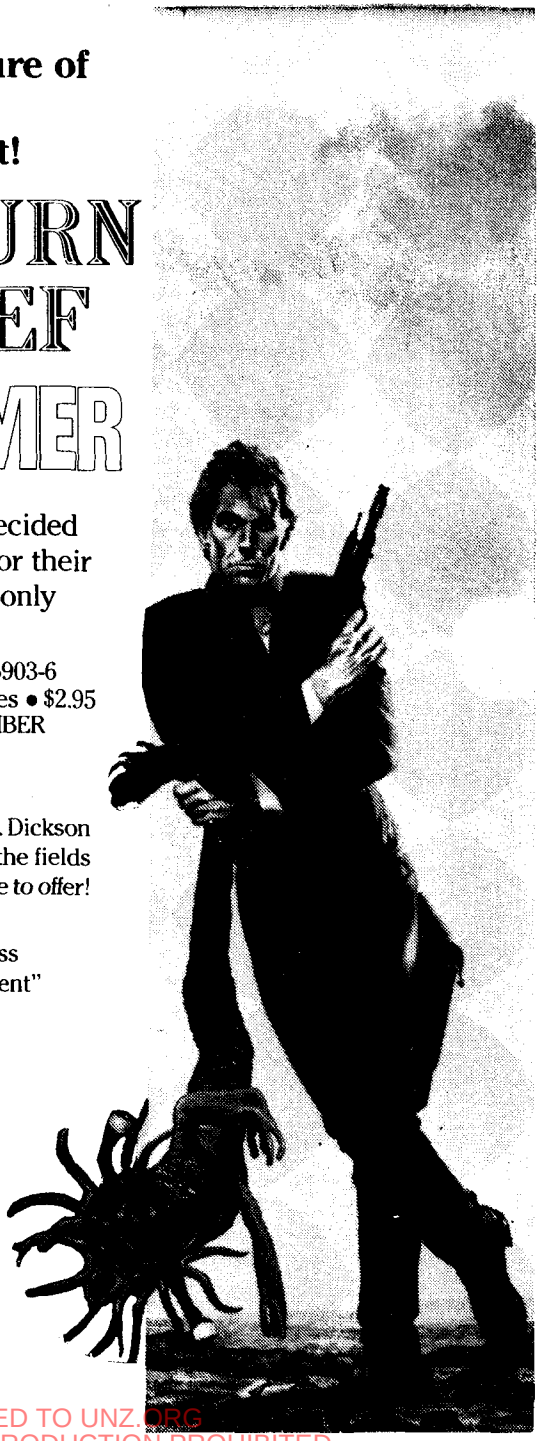

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icance was that the urge to make war is built into the intrinsic nature of human beings—*all* human beings.

And how can anybody who believes that be expected to devote any serious effort to finding ways to abolish war? If the postulate is correct, the very thought of abolishing war is nonsense at the most fundamental level, and only a fool would waste time thinking about it. A wise man can only accept the inevitable—even though that may include his own extinction.

Actually, there are very few statements that can accurately be made about an all-inclusive *we*. We all eat, we all drink, we all breathe* . . . but the vast majority of statements that purport to be universal descriptions of human beings are at most culturally biased generalizations about some *subgroup* of human beings. Even if it's quite a large subgroup, the existence of any exceptions invalidates the claim to universality—and any argument based on that claim.

"All people are warlike" is no more true (and quite possibly less true) than "All people have a desperate desire to believe in Universals." I personally know many individual exceptions to the claim of "warlike human nature"—men and women who find the notion of either personal violence or supporting anything that we would call "war" quite foreign to their own natures. And there are *cultural* exceptions, too. We (members of the culture in which I live) tend

(continued on page 151)

*Actually, even these may be too sweeping. There are patients, for example, who have been fed intravenously for years and do *not* eat in any usual sense. Such cases are likely to become increasingly frequent and varied as medicine and prosthetics continue to grow in sophistication.

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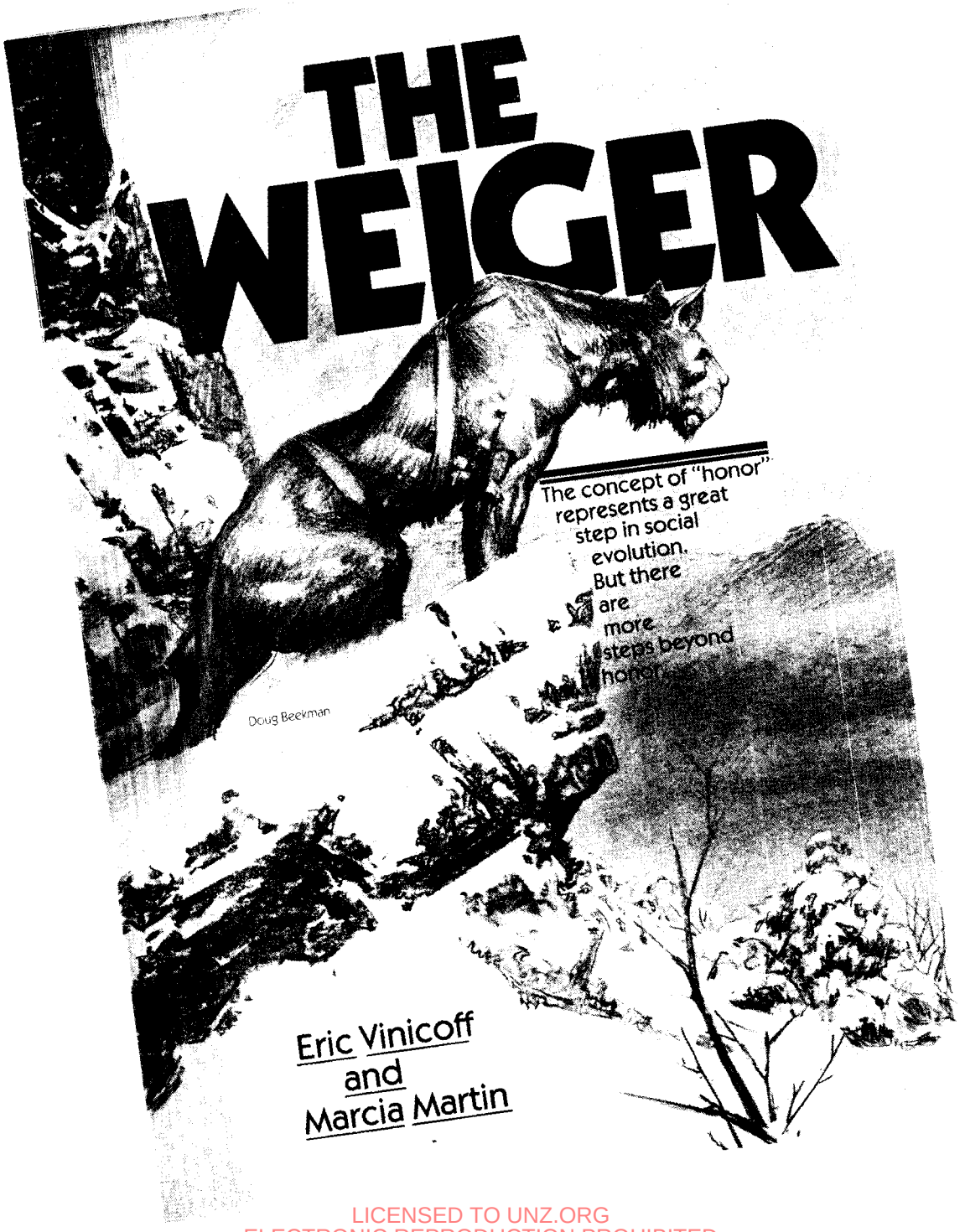
THE WEIGER



Eric Vinicoff
and
Marcia Martin

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Groundplant was a springy blur under my striding paws. The commonland trail followed a gap between two barren mounds—fancifully named Worldgod's Fangs. Ahead I could see the slope running down to the bend in the river and Coalgathering. A gray pelt of fog spread beyond the far bank. The morning was clear but breath-misting cold.

Overslept again, curse it. Even making the best speed my middle-aged bones could manage, I was going to be late opening my stall. At least I wasn't the only one; I smelled that Flatpaws the tanner and a couple of other late risers had passed recently.

I started down. To my left a claw of the eastern mountains reached out almost to the river. On its lower slopes were the mining territories that accounted for Coalgathering's name and existence. The town was a haphazard clustering of dirt streets and black-shingled roofs.

I slowed to a trot as I neared the South Gate, and inspected the town wall. Its poor condition was a continuing headache for me. It was still sturdy enough to keep out dangerous beasts, but just barely. In several places the strongwood logs were loose in their foundations, and many of the crossbeam nails were rusted through.

I dreaded the job of getting the necessary repairs made. The wall was still the only common project ever completed in Coalgathering's turbulent history. It had gone up before my time, after six years of squabbling and eleven deathduels, using up no less than four Weighers. Getting unanimous agreement on *anything* from over four hundred adults was a spinesnapping task. My own pet project—paving the streets so we wouldn't have to mudwade during the wet season—was tied up by the eternal pawful of adults unwilling to pledge their *twilga* even for something so generally useful.

But I would keep on haggling, and if necessary I too would meet stubborn holdouts on the challenge lawn. Aggravation was a way of life for a Weigher.

I stood up on my hindlegs and walked under the stone arch. Even after a night of airing out, the town-smells set my fangs to aching. Most of the stalls were open for business. Many adults were browsing and/or buying, and *tagnami* were scurrying about on errands. Two boats were tied up at the docks, loading coal. Both thunderfish pullers were thrashing in their harnesses, blowing tall plumes of dirty water, anxious to be away from the shore.

The Weigher's stall had a place of honor in the center of town, on the edge of the lush almost scarlet challenge lawn—kept lush by the constant infusions of blood. Since rain hadn't threatened overnight, I had left the wall flaps rolled up to let the river breeze air it out.

I dropped to four legs and loped once around the stall sniffing for any intruders. No fresh scents of adult, *tagnami* or animal. I went in.

I settled gratefully into the chair behind the big old desk. The five other chairs were for clients. Two tall cabinets bracketed my view of the challenge lawn; behind their glass-and-wood doors

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the shelves were crammed with leather-bound volumes of past *twilga* transactions.

"Slasher! About time you opened! I've been stalking your stall like a night-flier on the hunt for the last half hour!"

I knew him by his scent and hollow-jug voice before I looked up. "Good morning to you, too, Treesap," I said in my best placating tone. Weighers couldn't afford to take offense easily.

I gestured permission to enter. He stomped over and leaned across the desk. "No time to waste, Slasher! I can't see any patients until we settle this."

"Settle what?"

"You won't believe it until you see and smell it. Come on!"

"Will you slow down, for Kraal's sake, and explain what the problem is instead of blowing like a thunderfish?" I pointed to one of the chairs. "Why don't you sit down, take a deep breath, then tell me about it from the beginning?"

"I want you to come over to my stall," he said less violently, but still standing. "There's something there that . . . I don't understand. Not that I expect you to explain it to me. But it creates a *twilga* problem that's way beyond me."

I gave up, stood up and followed him out into the bright sunlight.

His stall was at the end of Doctor Street, near the docks. A crowd was gathered around it, in an ugly, snarling mood. As we edged through I found out the reason for the mood. Something was giving off a loathsome, dangerous smell. The fur on the back of my neck rose, and my fangs bared. Protective instinct shoved judgment aside.

No one was getting too close to the stall. Emerging from the crowd, I followed him warily on four legs.

And saw it lying on the planked floor.

Some kind of animal, unlike anything I had ever seen before. Almost as big as an adult, but thinner. It looked arboreal, with hindlegs that ended in lumpy silver paws, and spindly forelegs well suited to hanging onto branches. A slender neck supported a truly hideous head; black knotted fur on top but raw brown flesh everywhere else. Its flat face included round eyes, stubby ears, a monstrous nose and plant-chewing teeth. Its frail body was wrapped in a loose, slick white hide, with a decided lump on its back.

It was dead, of course. I gathered that the claw slashes across its throat had been put there by Treesap. "What happened?" I asked.

"I found it in here rummaging through my medical tools when I arrived this morning, so I killed it."

Perfectly understandable. With a spoor like that you wouldn't want to take any chances. This sort of thing happened every now and then; the wall wasn't a perfect defense against trespassing beasts.

It was a very odd corpse. "I don't think that hide is hide at all. It looks like a covering of some sort. And that lump could almost be a strange style of carrysack."

"So what?"

I hissed at his lack of imagination.

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"I've never seen, heard or read of any animal like that. Have you?"

Treesap hadn't.

There were several priests in the crowd, who suggested it might be a demon—though unlike any known to serve the Ninety-Nine Gods. The savants present were equally mystified.

"What do you want from me?" I asked Treesap.

"Well, this carcass belongs to me, doesn't it?"

I thought. "No one has claimed ownership?"

"Are you joking! If this monster belongs to someone, I'll deathduel him for unleashing it on me! It's ruining my business—no patients for sure until this place airs out!"

"Hmmm. Since no one has claimed it by now, I see no reason why you can't."

"Good. Rubbertail wants to buy it to cut up and study." The elderly biologist with patches of fur falling out entered the stall, her notebook out. "We haven't been able to negotiate a *twilga*."

"Let's go back to my stall," I said. "I can't think in this reek. It makes me want to kill something."

Once seated in my stall we went to work. It was a long and difficult session. I dug into my books and managed to find a few vaguely similar transactions. I finally named a compensation amount. They agreed—Treesap was unhappy, but not enough to take it to the challenge lawn. We inscribed the transaction, including my fee, in our notebooks. Then they left to haul the corpse over to Science Street.

The rest of the day was pretty dull. All my decisions were accepted. To survive as a Weigher your negotiating skills had to increase as your fighting skills aged. I was still one tough lady, but not quite as tough as in years past. A priest dragged in a worshiper who had fallen behind in his payments for religious instruction. A lovers' spat proved to be less convoluted and emotional than usual. The books yielded ready compensations for the loan of a tool, returning a strayed *tagnami*, letting a neighbor cross a territory and so on.

Things were so slow that I took a break soon after sunzenith. I loped over to Tavern Street, and settled into my usual chair under the painted leather awnings at Snakelegs' Place. The Snake, as everybody called him, brought over a mug of fermented direbeast milk spiced with darter blood. I sipped it, enjoying the warm glow, and chatted with the other regulars.

I smelled Irongut coming up behind me. The short fur on the back of my neck rose, and I felt the wonderful tingling just above the hindthighs. I turned. "Good day."

"Likewise." He smiled broadly. He was big, shaggy and muscular, with the thick fur of young adulthood. Not my usual type. But the charming, mature professionals were getting staid. Irongut was hardly an intellectual predator, but he was pleasant, aromatic and very energetic.

"Care to join me?" I asked.

In answer he sat lithely in the nearest

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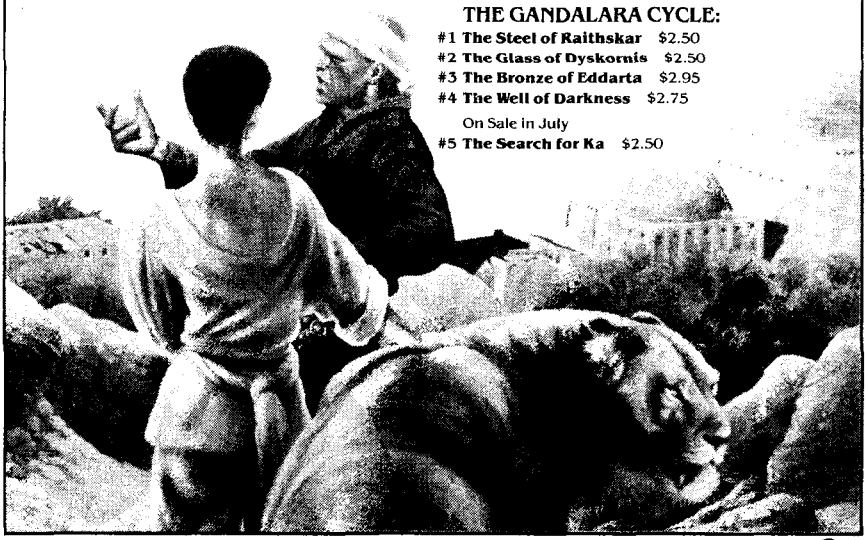

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chair, his long tail sticking straight down from the butthole. "Can't stay long. I've got a big pot in the kiln. Just stopped by to find out how you're keeping."

"Not too badly for an old bag of fur. I haven't caught scent of you in a few days. Where have you been hiding?"

His soft growl was sweetly bashful in such a savage young male. I remembered the frame of my bed straining almost to the breaking point, his paws raking my back, the buds of pleasure blossoming one after another. I took deep breaths and managed to retain my dignity. Let him come to me—it wouldn't be fitting for one of my years and stature to howl for him as if he were my first cublove.

He pulled himself together. "I wasn't sure you would want my company again."

"Don't try to fool a Weigher. You were hoping I would come to you. But you must remember that my pride is older and stronger than yours."

"I know that now," he said softly. "Which is why I'm here."

I growled laughter. While we were batting at each other with words, we were both struggling to keep our lust-scents from rising and revealing. But neither of us was being very successful—more of an embarrassment to me than him. If things got any more out of control, the adults in the nearby chairs would notice.

So I tried to push the thoughts and sensations into the back of my mind, and said, "Your pot might crack if you don't get back to it."

His smile turned rigid. "You're right. Maybe we'll catch scent of each other again soon."

"Maybe we will." If he had a nose worthy of the name, he wouldn't need more of an answer.

He trotted off stiffly, trying to look unconcerned. I finished my drink, settled up and went back to my stall.

Finally the sun slanted down behind the hills beyond the river. The boats pulled away from the docks and headed upstream. The stalls closed, and everyone streamed through the gates. The last adults out of town shut and barred the gates.

Amid a din of goodnight conversation we loped away, spreading out on the many commonland trails. The coal territory owners bounced and rattled in their runleg-pulled wagons.

At first I ran with many other adults and *tagnami*—some of the latter on their parents' choke leashes. We chatted as we climbed toward the gap between the Fangs, setting an easy pace. The wind was turning sharp, but the smell of open country was invigorating after the townreek. Groundplant turned into shadowed forest around us. Our group dwindled as we came to territory after territory until, reaching mine, I also took my leave.

Violet tangletree and fireclaw bush scented the air, over the seasonal rankness of mouldering leaves. Shafts of yellow light slanted through gaps in the trees. Above the gaunt strongwood branches the day was beginning to darken. I was ready for a hearty dinner, and an early bed—I hoped not alone.

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The cabin looked and smelled right as I approached it from downwind. It sat in the middle of a small clearing, straddling a creek that ran down to the river. Its strongwood planks were stained black with a waterproofing concoction. I glanced unhappily at several upkeep jobs that needed doing before the first snow, then swung open the doorway bars and went in.

I lit candles to fend off the fast-falling night. Nikniks were starting to chirp beyond the door and windows. The wind carried faint, tantalizing promises of many tasty animals. No rain anywhere near. Perfect hunting weather.

The creek was a trench-like space in the floor planking. I took no more than a sip from it. Hunting on a bloated bladder at my age was asking for indigestion.

The night was complete under the forest canopy. I couldn't see much, even after my darksight adjusted. But this was my territory. I knew every tree and fallen leaf. And I had my nose and ears.

I prowled along the river bank on four legs, and waited for some tasty nocturnal animal to arrive for a 'morning' drink. I settled in behind a millioneye shrub downwind of a favorite watering place for the local fauna. No scent of poachers or predators. Good.

I heard and smelled a family of lumpmeats waddle up to the bank. I tasted rising saliva. Lumpmeats were an acquired taste, but I had acquired it as a cub. Their hard shells and stubby legs gave them the defensive posture of a rock. You had to move like moonlight and decapitate them on the first swipe, before they could retreat into their shells.

I decided on the bulbous head of the family, and charged. The others hid in their shells, but I nailed papa. Out sprang my forepaw claws. Off went the head. The survivors scuttled into the river and floated away while I dined.

Leaving pretty much an empty bowl for the scavengers, I drank from the river and wiped blood from the fur around my mouth. My tail waved happily.

I walked slowly back to the cabin, and stretched out on the bed to relax and digest. The draft blowing through was rich with the tale of the night, and a bit chilly. But not uncomfortably so; I didn't figure on having to use the firehearth until snow covered the ground. Drowsiness began to claim me.

Howling snapped me out of it. Faint howling from the northeast border of my territory.

Not a danger call or a challenge. Not even an entry request from a visiting friend. It was a lusty mating call. I recognized Irongut's deep baritone.

I felt that tingling again, and suddenly wasn't the least bit sleepy. Should I tighten his leash even more? No, he had learned his lesson—there was an earnest sincerity in the growls. Moreover, my own self-control wasn't nearly as legendary as I sometimes liked to think. My body moaned for him. Enjoy, it said. You won't excite the young males much longer.

I sprang to a window and howled back my invitation. Returning to the

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bed, I waited and tried to pretend calmness.

Then, nearer, I heard him howl again. I leaped to four legs. A blood challenge! What in the great world womb could he be fighting here on my territory? Most of the large predators had learned better the hard way. Maybe a wild adult had wandered down from the hills, hungry or sick enough to have ignored my warnoffs.

Trespass on my territory! I ran out the door toward the howls, which were subsiding into fighting snarls. Something screamed—a high-pitched shriek that I didn't recognize. Then silence, except for the cautiously returning forest sounds.

I plunged through a thick tangle of shrubs.

In a meadow not far from the cabin, under the light of two newly risen moons, I found Irongut snarling a few strides upwind of his kill.

I caught a whiff of the corpse, and quickly joined Irongut upwind.

He was breathing hard, but otherwise intact. "I offer you *twilga* for hunting on your territory," he said apologetically.

It was a formality, of course. No one could have done anything except attack such an obvious enemy, no matter where encountered. I wasn't the type to worry about technicalities. "It was a trespasser, not part of my game stock. And it sure as death doesn't smell edible. No value, no *twilga*."

We both stared at the creature.

"What is it?" Irongut asked. "I've never seen or smelled the like."

"I have. One was killed in town today. But it's certainly a new item for the biology texts. Even the savants had no answers."

It was definitely the same species of puny, furless monster. My fangs bared in a soft growl. I edged closer for a careful sniff; all I could stand. "Something is wrong here."

"Huh?"

"This creature smells like the other one."

"So? Probably a pack of them are migrating over the mountains. Believe me, they're no fighters. This one hardly put up a struggle. If any more of them trespass, we'll slaughter them."

"I mean they smell *exactly* alike. Not like the same species or even the same pack—like the *same creature*. But that's impossible. The other one is dead, probably cut up and in jars of alcohol by now."

He shrugged. "One more riddle for the savants."

I noticed a small box lying on the ground next to the corpse. It was white, and slick like varnished wood, but the material didn't look familiar. It had odd tiny features on one side, and a rectangular opening. "Is that yours?" I asked.

"No. The creature was playing with it when I came into the clearing."

"Playing?"

"Taking bits of plants, bugs, leaves and so on, shoving them into the hole in the box, then jabbing at those little bumps on the side."

I was inclined to laugh, but didn't want to hurt his feelings and ruin the

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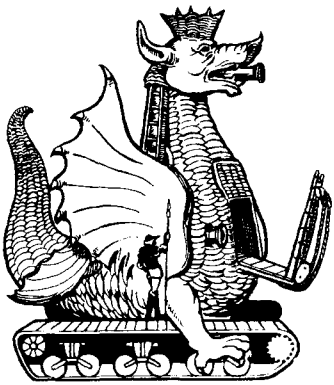

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night. "How do you think it came by the box?"

"Probably stole it from someone's cabin during the day. If so, we'll most likely hear about it tomorrow."

I took his forepaw in mine. "Let's leave the carcass for the crawlers. I'm in no mood for mysteries tonight." But I decided to return in a few nights, when the spoor would be blown to the winds, to have a better look at the box.

"I'm glad you invited me in," he said softly.

"I'm glad you came."

Our scents were definitely communicating now. I was very aware of my hindthighs rubbing together as I moved.

Without further words, and with ill-concealed haste, we loped toward the cabin.

I kicked the fur blanket aside and rolled out of bed, getting all four legs under me before landing. Pretty frisky for a mature lady, especially after such a night. Irongut had left shortly before moonset.

It was a fine morning, with a heady blend of forest aromas drifting in through the door and windows. The cloudless sky was beginning to brighten. I had overslept again.

Plunging my head into the creek-trench, I came up howling and shaking off frigid water. At the wall mirror I combed out my fur, one hundred strokes head to hindpaws. I admired myself in the mirror. Still a classic specimen of femininity. Glossy black fur. Gleaming fangs. Boldly jutting snout. Just the right amount of arch in the back. Stomach firm, with no middle-aged droop. The scars across my left shoulder and flank were healing well. They reminded me to check my trap before heading for town.

I went outside. No hostile scents. But, on the other hand, no nearby breakfast. First things first. I loped through the forest and across dew-covered meadows to the border of my territory.

Running the bounds at top speed, I came across no suspicious spoor except the one trail I expected. I squatted and defecated in the usual places. I didn't meet any of my neighbors—I was definitely running late—but I could tell they had already set their warnoffs.

I slunk along a game trail, and managed to chase down a pair of darters before they could scurry up a tree. Then I headed for the trap.

I had dug it on a high slope near the eastern border of my territory, where cubs sometimes wandered down from the hills to hunt. Game tended to be more plentiful in the territories because we had settled the best land to begin with, and then purged it of all predators but ourselves.

As I approached the trap, I could smell a cub in it. I peered over the edge of the six foot pit. A healthy looking little furball about seven or eight years old. Perfect. Younger than that they weren't mature enough to handle *tagnami* education. And older, if still wild, they were unteachable. But this one would do just fine.

It stood on its hindpaws, trying to claw its way out of the pit. It eyed me warily, and stank of fear. I wondered

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if it could have been one of mine. I had gone into the Wild four times to drop cubs. But no, the timing wasn't right for any of them.

Some education and discipline, and this one (a male) would make a fine replacement for Keeneyes. Too bad it hadn't been Keenbrain—my *tagnami* had been a bit too greedy and a bit too slow. A fatal combination. He had posted his challenge before reaching his fighting peak, convinced that the old lady had aged enough to be taken. He had been wrong, barely. So now I needed a new *tagnami* to do the scut work (and maybe someday take my job and territory and life from me as I had from my parent).

Enough daydreaming. I jabbed a forepaw down into the pit, managed to avoid the young claws, and got him by the scruff of the neck. Up and out. He yowled and squirmed, so I cuffed him unconscious. I perched the limp body on my back and set out for town.

The added weight slowed me a bit, and I arrived even later than yesterday. I went straight to School Street and old Bentback's stall. He was, as usual, at his chalkboard trying to beat some sense into about a dozen cubs. They were chained to two log benches while he alternately taught and applied his short rawhide whip.

"Morning, Slasher," Bentback growled, coming over to me. He took the cub and looked at it with a skilled eye, casually avoiding the tiny claws—it was waking up. "Going to try again, eh?"

"You know how it is. Can't live with them or without them."

"The real trick is outliving them. Got a name for this one?"

I hadn't thought about it, so I did now. The cub was a bit short for his age. "How about Runt?"

"With a name like that, he'll either grow up into a great fighter or die young."

"That's the general idea."

We brought out our notebooks and writing sticks. "What's your current rate?" I asked.

"Three per day for as long as it takes."

"Pretty steep. I can do better down the street."

"You get what you pay for. I limit my class size to give individual attention."

"So be it." We checked our notebooks and found a balance in my favor from a Weighing last month. We subtracted a day's fee and entered the new balance. My job gave me *twilga* with almost everyone in town; no need to play around with third party balances.

Bentback took Runt and a length of chain over to an empty spot at the end of a log. "See you at dusk," he growled to me.

I hurried along Breeder Street toward my stall. The aromas raised saliva even though I had just eaten. Growls, bleets, chitterings, cheeps, honks and haggling created an ear-curdling din. I admired the pens filled with direbeasts, lumpmeats, darters; literally every kind of game animal.

My territory was pretty well stocked

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at the moment. But come the end of snow season it would need restocking. Then I would make the necessary purchases. Reluctantly, because no one liked doing business with breeders. They were an odd, less-than-respectable lot, suspected of 'stalking' meals in their pens and other dark deeds.

I opened my stall. Business was brisk, so much so that I almost forgot about the less pleasant of my two nocturnal visitors. Irongut, however, was a warm and finely etched memory, and a promise of even better nights to come.

After a morning flurry of decisions and non-lethal challenges stemming mostly from a by-all-accounts excellent hunt-party at Treeroot's place, I took advantage of the lull to relax. Leaning back in my chair, I put my hindlegs up on the desk. I was too comfortable to get up. I wished a mug of warm fermented milk would appear on my desk in a bolt of sorcerous lightning.

Peripherally I noticed something was happening outside. I couldn't tell what, but from all around town adults were converging on the challenge lawn. No ordinary fight would draw such a big crowd, and besides everyone was looking at the sky. Curiosity got the better of comfort. I got up and went outside.

Leaden gray clouds hung low overhead, and a cold rain was imminent. But that wasn't the object of everyone's attention.

Something was falling from the sky. Not really falling, but coming down slowly, like a swampflower's seed sac. But this was round, white and *huge* —bigger than a demonflier. A smaller object was dangling underneath it, attached by long ropes.

It was coming down in the middle of the challenge lawn.

The losers of the morning's festivities had long since left to visit their doctors. A napping Traveler hastily vacated the lawn, and the entire circle was empty. But, by the time the thing was about to land, it was ringed by curious adults. Including me.

The smaller object settled onto the red groundplant. Somehow I wasn't surprised to see it was another of the outlandish creatures that suddenly seemed determined to plague my life. Standing erect on its hindlgs, it touched its chest with a forepaw and the ropes pulled free. The huge white ball rose sharply, taking the ropes along. In seconds all were swallowed by the clouds.

The creature had a glass bowl over its head, but otherwise it looked exactly like the other two. Its spoor hadn't reached me yet on the still air, but I would have taken any wager that it smelled the same, too.

Everyone was enjoying the unique show. A few priests were crying of a divine coming, but no rational adult could really believe that this puny, tailless, evil creature hailed from any god-home.

The creature lifted the bowl from its head, and dropped it on the lawn. It stared at us in silence. Slowly it raised its odd right forepaw in the air, the pad facing front and all five claw-tips sticking up.

Savants were arguing eagerly among themselves. The upshot of one debate

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near me was that this must certainly be an intelligent being, maybe even as intelligent as an adult. The ball-and-ropes could have been some sort of monstrous unknown animal. But the white hide of yesterday's corpse had turned out to be a manufactured garment, like harsh weather cloaks though exotic in design and material. Under it Rubbertail had found more of the hideous brown flesh. This hide looked identical. And the carrysack was also identical—the carrysack that had turned out to be filled with things that were mostly total mysteries.

The priests, on the other hand, were stirring themselves up with talk about demons and ill omens.

The situation was definitely novel. Everybody was waiting for someone to take the initiative in doing something about it. There wasn't any time for a town meeting. I could see that some of our more notorious hotheads, notably Farrunner the iron-worker, were baring their fangs. That terrible spoor was beginning to spread. Many others in the crowd were awaiting a rare battle with hopeful grins.

I remembered the box I had seen last night, and was prepared to go along with the idea that the creature was intelligent. Though not very, or it wouldn't have come so docilely to its dying place. But the questions the savants were asking each other were also bouncing around inside my skull. What was it? Where did it come from? How many more of them were there? Why were they popping up all of a sudden?

But it didn't look like the savants would get the chance to put their questions to the creature. Farrunner took three strides toward it, then turned to face us. "I post a challenge! This beast is evil and dangerous; you can all smell that! Do any of you want to interfere?"

The priests looked pleased with this development. Some of the other hotheads were upset at being excluded from the fun, but Farrunner had a well deserved reputation. No one challenged his posting. He smiled smugly at the savants, who growled under their breaths but didn't dare object aloud. Savants were rarely great fighters. The creature didn't react.

Howls were coming from all around the ring. The mood was definitely for blood. I felt the rage too, but fought to control it. Weighers were supposed to look beyond obvious answers, and exercise self-discipline while doing so. Killing these creatures every time one turned up wouldn't solve any of the riddles.

I stepped forward. "Wait up, Farrunner. This is something that has never happened before. It may be more complicated than it seems."

"No complications, Slasher. I'll just let its blood out."

"I think you should let some of the savants have it. I'll work out a fair *twilga*."

"I'll be very glad to sell the carcass," Farrunner growled. "Don't interfere, you old bitch."

That did it. I had tried to be polite. I had tried to be reasonable. But the young punk had a venom-soaked tongue. I wasn't sure I could take him, but life without pride was a cold thing anyway.

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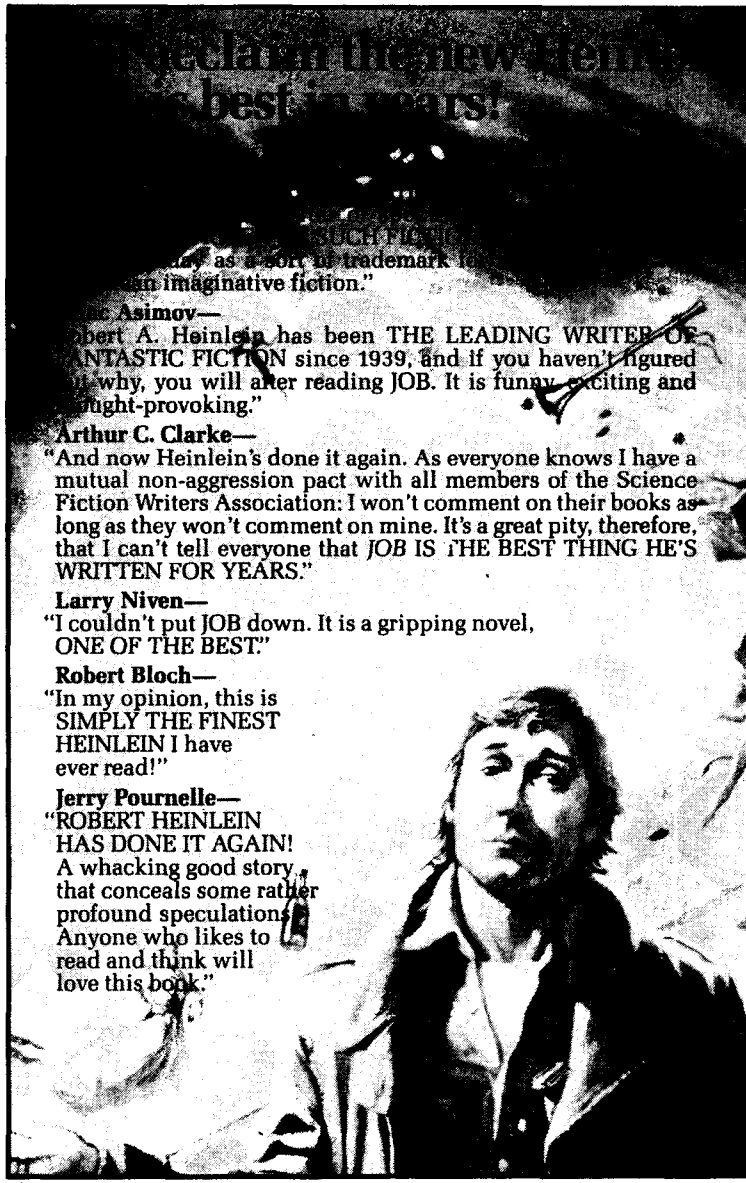
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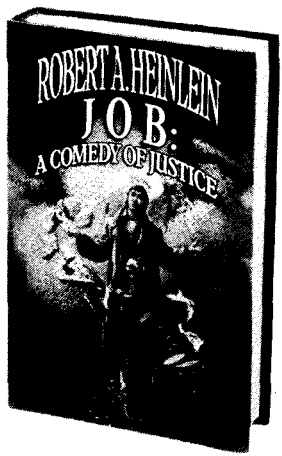

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Moreover, I had a hunch that the answers to my questions might be too important—and not just to the savants—to let them bleed to death on the challenge lawn.

"I challenge, mudworm."

So much for the formalities. He dropped to four legs, and so did I. The nearest spectators moved back. The creature continued to watch in patient silence.

We circled each other warily. He knew my reputation, too. We hissed at each other, but spoke no more words.

Strategy, girl. Strategy. He was too big, strong and mean to charge. His reflexes were sharper than mine. So what did I have in my favor? Experience, maybe. I would have to try to outguess him.

An all or nothing proposition.

I slunk forward to within three strides of him. Pouncing range. A wary veteran would have looked over all the angles first, but he wasn't known for his patience.

He lunged, a furry blur almost too quick to be seen. Claws raked for my throat.

But my planned countermove was also a blur. Not sideways; that was the expected reaction. His horizontal slash covered too wide an arc for me to avoid. I dropped under the claws, and sprang forward.

My timing had to be perfect. It was. There was his undefended neck right in front of me.

His claws tore desperately at my back. I lost some fur and flesh. But my fangs bit deeply into the tough neck muscle. Arterial blood spurted. My jaws clamped shut, and ripped.

I spat out fur and warm meat; cannibalism was considered in very bad taste. Farrunner dropped. His life poured out onto the lawn, at first swiftly, then sluggishly, then no more.

My regular doctor loped toward me with that *twilga* gleam in his eye, but I growled him back. Time enough for that later. The blood staining the fur on my left flank wasn't too wide a stream, and the pain was no worse than I had known and endured many times before.

The creature was still standing and staring.

Now I owned everything that had been Farrunner's. I didn't want any of it—his territory wasn't nearly as nice as mine—so I would probably sell it to his *tagnami*. But now I had a more urgent matter to worry about.

"I'm claiming the challenge-right for this creature!" I shouted to the spectators. "Anyone feel luckier than Farrunner?"

Several other hotheads looked and smelled inclined to take me up on my invitation. The general mood was definitely getting ugly. I felt the same unreasoning hatred of the creature distorting my own judgment. Any moment now we would all fall upon it in a slaughtering frenzy, despite my challenge-right. How could something so puny and helpless have such a dangerous scent?

It was as simple as that.

"Rubbertail!" I shouted at the nearby cluster of savants. "Do you have any jars of alcohol in your stall?"

She looked wounded. "A tragedy is

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about to happen here! This is no time for guzzling!''

''You old fool! If you want to save this creature for science, run like a cub and bring me a big jar of alcohol!''

She reflected for a moment, then smiled broadly. She vanished beyond the ring, but quickly returned with a sizeable ceramic jar. ''Here you are, Slasher,'' she panted.

I took it. ''We'll settle the *twilga* later!''

Just in time. Some adults had dropped to four legs and were slinking toward the creature, fangs bared. I shouted, ''Wait, my friends! Please! A moment for your Weigher! I think I can end the danger!''

There were growls of protest, but the slinking stopped momentarily.

I took a deep breath, and walked toward the creature. What would it do? If it tried to bolt, we were both out of luck.

It stood still. It watched me steadily, though, as I removed the jar's lid and poured the contents all over it. It flinched, but didn't try to avoid the stinging alcohol. Maybe it understood.

I breathed as shallowly as possible. The alcohol murdered my nose, but the scent of the creature was totally drowned. I found I could now deal with it with a Weigher's proper dispassion.

It stood as if it never dropped to four legs. The forepaws were slender and frail-looking, but well shaped for working with tools. The lack of a tail made it seem unbalanced.

I could feel the blood-rage seeping out of the spectators. The prospects for a unique death-duel were fading fast; some adults were already drifting back to their stalls. The attitude of the rest was subsiding into curiosity.

The creature reached into its carrysack and pulled out a small gray box with two short black strings dangling from it. The strings ended in a pair of black bulbs like half-eggs. It put one of them to its forehead, and it stuck there. The creature held out the other one to me, twisting its mouth in some kind of expression.

I thought I knew what it wanted, but wasn't sure I wanted to oblige. It could have been a harmless friendship ritual. Or something else.

Some savants were edging up behind me, chattering like grakklbirds in mating season. A few priests came with them.

To the netherworld with it! I stuck the other bulb to my forehead.

The creature touched a red circle on the box.

Three seconds later I ripped the bulb from my forehead, and howled like a cub.

Images had stampeded through my mind like a herd of spooked bigmeats. Hundreds. Hundreds of hundreds. Much too fast to be seen, but I sensed that some of them were my own memories. Others were . . . from somewhere else. I shivered, and had no desire to see those more clearly.

The creature put the demon-box back in its carrysack. ''Are you able to understand me?'' it asked.

The discussions behind me jumped several notches in volume. The words

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from the oddly flat muzzle were just barely understandable. "Yes," I replied, "if you speak very slowly."

"That's good. My name is Ralphayers."

"I'm Slasher. What did you just do to me?"

"The box is a tool for learning languages quickly. It isn't harmful."

I didn't believe in magic. But if it was a product of science, this ugly monster knew things of which our savants only dreamed. "We can settle the *twilga* for that later, Ralphayers, and for my other service."

"Other service?"

"Keeping you alive. So far, at least."

"I see. I'm a stranger here, with different customs. But I'll follow yours as soon as I can learn them."

"What are you? Where do you come from?"

The creature paused before answering. "Just as this world circles your sun, other worlds circle other stars. I'm from one of them called Earth."

That was a mighty big bite to get down. Still, the astronomy matched certain radical theories. And nothing even remotely like this creature was known to our biology—or demonology for that matter. So accept it as a working hypothesis. "How did you get here? And why?"

"My people built a . . . a skyboat. It sailed here on a voyage of many years, crewed only by machines, and it now circles this world. When the machines found that living conditions here were like Earth's, they . . . grew three of me from embryos stored aboard. Each of us landed in turn to learn what we could about this world before dying. That wasn't long for my two brothers."

The savants were taking all this in avidly, as were the few others who remained. I understood maybe a third of what it had said, but I went on doggedly. "What do you do with this information you gather?"

"The skyboat . . . hears everything that happens to us. It sends messages back to our world. They will take years to arrive there, so we can't talk to our world. But we can communicate with the skyboat."

So that was why the other creature had been putting plants and bugs in its box. It had been doing some kind of research. Fascinating. Obviously this was a venture involving more participants and *twilga* than I had ever imagined possible. What incredible Weighers they must have!

"Why are you doing this?" I asked. "What could possibly repay such a huge effort?"

"Pure knowledge. We're a very curious people. Plus we've found that indulging our hunger for knowledge can be profitable in practical terms. To learn about your people and your world I hope to live among you."

"That won't be easy," I pointed out. "You know nothing of our customs, and one mistake will most likely be your last. You can't even come near us without being doused in something with an overpowering smell."

"I think I understand why your people killed my brothers," the creature said softly. "An instinctive scent-hos-

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tility trigger. An oddly primitive trait to find in an intelligent species. So I smell like an enemy, do I?"

I growled yes. What a prize this creature would be if I could handle the opportunity properly. It clearly knew things many adults would pay through the snout to learn. And it would need an intermediary, someone with the imagination to exploit its knowledge for everyone's good, and the skill to keep it alive. Who better than a Weigher? Who else would have the wisdom to work for the town as well as herself? Who else would be able to unravel the unique *twilga* involved?

The gods don't like to hear us praise our abilities too much, even in our thoughts. As I dreamed, my common sense slept. And I saw a blurred motion behind the creature.

I had forgotten there was one person who would hold a grudge against the creature not based on scent. One to whom the honor won by finishing his father's last task would justify the deadly risk of offending me by usurping my challenge-right.

Before I could react the creature dropped, bright red blood puddling under it, the head almost detached from the scrawny neck. I glared across the carcass at Farrunner's *tagnami*.

A more impetuous adult in my place would have challenged him for his audacity. But I was a Weigher, and anyway I admired his loyalty. A rare trait in today's youth.

"I offer *twilga* in apology," he said formally.

I stared at the creature, feeling a sadness greater than I understood. So many things we might have learned.

To the *tagnami* I said, "I accept. Wait for me a moment. We'll go to my stall and settle the amount."

Those who had been hoping for a last bit of blood from us headed back to their stalls. A few closed in to gawk at the carcass. I quickly made deals with two savants for it and its carrysack. Then I let my doctor guide my less-than-steady legs toward his stall for the overdue patch job. Farrunner's heir—*tagnami* no longer—followed me dutifully. I intended to punish his insolence with a *twilga* settlement he would be years repaying.

Weeks passed, and life settled back to normal, though speculations about the creatures were growing into epic legends. The first snows came, draping the forests and meadows in scattered whiteness. The days became shorter. Adults spent less time in town and more time laired in their territories, living on scarce game and winter-fat.

But Weighers were expected to be available as many days as possible. So it was that on a gray threatening afternoon I sat in my stall, warming my hindpaws over a small hearthfire.

I had just settled a debt problem without any challenges, and I felt indecently pleased with myself. Longfur had been dragged in by a pawful of adults with whom he had been tardy in paying his *twilga*. Had he been a real deadbeat I would have given him the usual options of settling up at once or fighting his creditors in a circle challenge. But he

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was a responsible adult whose fermented milk trade had temporarily slumped. So I worked out a *twilga* increase and installment payments that satisfied everyone.

My relaxed mood was interrupted when someone outside shouted, "More of them! Come and see, everyone! More of them!"

I stepped out into the windless but still biting chill. A priest was pointing at the clouds. Everyone within earshot also looked, but most of them, having seen it before, paid no further attention.

Still, a pawful of savants and priests joined me in hurrying to the challenge lawn.

Not one, but two creatures were falling from the sky.

They landed the same way the other had, and removed the bowls from their heads. One was another exact copy. But the other was shorter, a bit thinner and curiously curved.

"Welcome!" I shouted. The other adults stood silently at the lawn's edge, honoring my outstanding challenge-right.

"Good to see you again, Slasher," the Ralphayers copy answered.

"Are you trying to make me believe in ghosts?" I asked after a pause. "The others like you are all dead."

"Everything my brothers did I remember. So I feel I know you." He and the other creature started to walk toward me.

"Stay where you are," I warned them, "unless you want to be turned into memories, too. Stay where we can't smell you."

Their faces twisted. The smaller creature said in a high-pitched tone, "I think we'll be safe from that danger at least."

I realized two startling facts just as shouts from some of the savants announced them. First, both creatures were speaking our language just as naturally as any townfolk. Second and more important, the faint whiffs of their spoor were totally unlike the evil scent of the others.

They smelled like . . . like groundflowers! Harmless, pleasant flowers. There were no growls from those gathered behind me. If anything, there were a few purrs.

"Are you like the nightslitherer that can change its scent?" I asked.

"No," the copy said. "But when the machines aboard the skyboat grew us after my last brother died, they made changes in our body design so that we can live among you. My brothers had collected the necessary knowledge. We can eat your plants and animals—we're omnivores."

Roots and leaves? I shuddered.

"We want to learn as much as possible about you and your world," the smaller one added. "This will be a long study, one we hope our *tagnami* will continue when we die. They must, since the skyboat machines can grow no more of us."

Here was a second chance at their incredible knowledge. If I could keep these two alive. "You must learn our customs quickly. You obviously aren't fighters, so you must learn how not to offend."

The copy paused. "We're more dangerous fighters than you can imagine.

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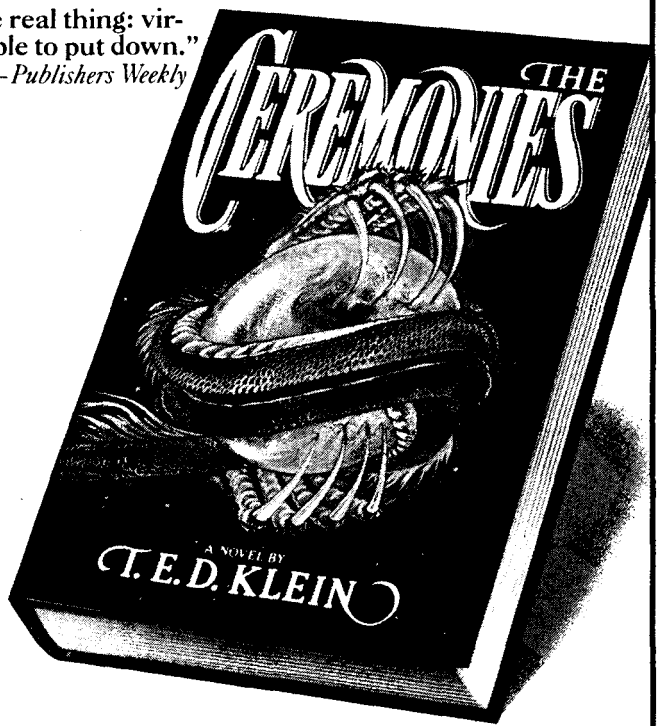

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But we're here to make friends and learn. Like my brothers, we would rather die than fight you. We love life as much as you do, but we believe in what we're doing even more."

I would attempt to figure that out later. Right now I had the greatest *twilga* transaction in history to arrange. It would be the stuff of legends among Weighers, and would of course compensate me handsomely.

"You'll need someone to teach you our customs and vouch for you with fang and claw until the town accepts you."

The smaller one said, "We have a store of scientific and technological information aboard the skyboat, which we can summon through our machines. Some of it should be of use to you. We'll give it to you."

I shuddered again. Luckily no one else had been close enough to hear. "*Never* offer to give an adult anything!" I said sharply. "It could prove fatal."

"Why?"

They had so much to learn. What kind of crazy customs did they live by? "To suggest an adult needs help as if she were a *tagnami* is the worst possible insult. You must *sell* your knowledge for a good price, and thereby establish your worth."

The creatures jabbered at each other in low voices. Then the smaller one said, "We'll have to hire the services of someone who can teach us what we need to know."

"Of course, and I recommend myself for the job. I'm the town Weigher, an excellent haggler, well educated—and a tough fighter, to deal with any challenges that come your way."

"What's a Weigher?" the copy asked.

"We balance the values of goods, services and violations of custom so adults can interact more constructively. And less violently."

"You . . . run the town?"

"I don't understand your question. Adults run their own territories and town affairs."

The creatures jabbered some more. "We accept your offer," the copy said, "and trust you to set a fair price for your agent and guide services. How do we begin?"

I thought. "First we have to get you a territory. Let me think . . . ah, the Coldcrag place. I'm sure I can get it for you cheaply. The game stock is lousy."

"No problem there. We can eat many plants that grow in this area."

"Good." I hid my real reaction to their diet. "I'll get you installed there, start your education in our customs, and smooth the trail for you here in town."

That last didn't look as though it would be too difficult. The savants and priests were gathered around, hanging on every word. Not too close—they had heard my commitment to handle challenges for the creatures. That claw slashed both ways.

"Go back to whatever you were doing!" I shouted at them. "You'll all have the chance to quench your curiosity later, at a very modest *twilga*."

The adults drifted away reluctantly. The three of us were soon alone on the challenge lawn. "Come with me while

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I negotiate for the territory and some other essentials for you," I said to them. "I strongly suggest you say and do nothing unless I tell you to."

I set out for Broker Street, and they followed behind like a pair of well-trained *tagnami*.

The next few ten-days were as hectic as any I could recall. As well as tending my territory, my new *tagnami* and my Weighing, I had the two humans (their name for themselves) to look after. And in many ways they were as helpless as Runt.

I negotiated a very good *twilga* with the broker handling the Coldcrag territory. On the long walk out to it I learned the copy was also named Ralphayers, and was a male adult, while the other was Pamayers, a female adult. The scarcity of game and the dilapidated cabin didn't bother them; they found plenty of edible plants. I was surprised by how they acted like a single adult in many things (even their living arrangements!). But they seemed even more surprised when I explained how they had to mark their bounds.

Artisans were hired to patch up the cabin—including such bizarre notions as a solid wood door and glass window covers. Others scratched behind their ears in confusion, then produced furniture unlike anything ever seen before. I was at their cabin when another balloon dropped from the sky, bringing an adult-high metal cylinder from which the humans removed an amazing assortment of items. I was right about their ineptness as hunters, but with new breeding stock and a cheat they called a bow they managed to bring down some meat.

Coming up with the *twilga* for all this was no problem. The humans were able to supply valuable knowledge on just about any subject. Savants, artisans, professionals, tradesfolk, adults in every field; the trickle of customers became a rushing stream, then a broad and powerful river. Thanks in no small part to my agenting. The humans rejected some requests because the knowledge was too advanced to be of use, and others because it might be dangerous. But that still left more than enough business.

Teaching them civilized behavior was the hardest part of my job, and for the first few ten-days I had all I could handle keeping them alive. But by the time the days reached their shortest they were settled in and reasonably accepted.

As usual, I was puffing for breath when I reached the border of the humans' territory. The scrawny woods climbing the mountain's paws were as far from town as you could get before finding yourself in the Wild. The snow-draped pricklytrees and redberry bushes were far apart and positively anemic.

I howled for permission to enter. Moments later I heard the three horn blasts granting permission—neither human had the lung power for entry calls.

Their cabin sat on a granite shelf overlooking the river valley below Coalgathering. It was now by far the largest I have ever seen, with no less than five rooms for the various odd human activities.

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Ralphayers stood by the open door. "Welcome, Slasher. Care to come inside?"

Flower smell or not, being inside their boarded-up cabin made my jaws ache. But I knew the humans found snow and near-freezing temperatures uncomfortable. "Okay."

They had a warm fire going in the wall hearth (one of their highly profitable innovations) of their "living room." Pamayers was seated at a table reading a book aloud. The strange box they called a "radio" was in front of her. The humans had a fantastic appetite for our books; recent purchases were stacked all around the floor. "Hi, Slasher," she said. "What's happening?"

My visit had an ulterior purpose. I didn't see how talking my problem over with them could help, but they were full of surprises and I was out of ideas. Still, politeness dictated some small talk first. "How are your studies coming?"

"Incredibly," Pamayers said, putting down the book. Ralphayers sat in a chair by the fire, while I stretched out on a rug. "There's so much data to collect, digest and relay to the skyboat for transmission home. We're beginning to unravel a few of the tough questions about your people."

"Such as?" I asked.

"Such as why you're intelligent."

They were always raising the sort of topics that caused me headaches. "I hope you're not looking at me for an answer. You should talk to old Rubbertail and the other biologists."

"We have. Our working hypothesis is that you evolved intelligence as protection against a danger bigger than starvation or hostile predators; yourselves. With your territorial instinct and year-round breeding there must have always been tremendous population pressure and competition for the best land. The smarter adults fought better, and figured out ways to avoid more fights. They tended to be the survivors and breeders."

That made a vague kind of sense. "Our earliest legends tell of adults fighting over territories to the verge of racial extinction, until the hero brings peace by establishing a primitive version of our present customs."

"They're probably accurate," Pamayers commented, "except the 'hero' was more likely a long and difficult socialization process. From simple live-and-let-live at watering holes to your towns, territories and *twilga*."

Ralphayers was staring at me. "You didn't come here for a scholarly discussion. Out with it, Slasher."

"Okay. But first we have to settle the *twilga* I'll owe you for your advice."

"Don't be silly," Ralphayers said. "It's the least we can do, after all that you've—" He caught himself, helped by Pamayers' frown as well as my rising growl. "Sorry. The standard fee will be fine by us. What's your problem?"

"You walk in it every time you go to town, or rather swim in it. The dirt streets. I've been trying for years to get everyone to pledge *twilga* to get them paved."

"We remember your sales pitch," Pamayers said. "Surely the whole town

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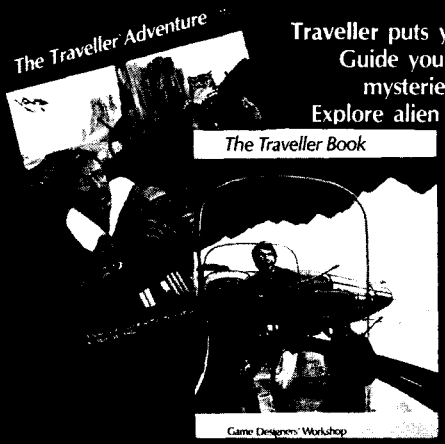

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would want to chip in for something like that."

I laughed bitterly. "You couldn't get everyone to agree the sun rises in the east. I've whittled the holdouts down to four, but I can't budge them. Any suggestions?"

The humans jabbered at each other in their own language, then Ralphayers said to me, "Your problem is inherent in your social system. It's why you have progressed relatively slowly in fields requiring group effort. Don't you have any customs for resolving such impasses?"

"If the need were great enough, I could challenge them. But it isn't. All that leaves is persuasion."

"We have a suggestion. It stretches your ethical structure a bit, but we don't think it's an outright break."

"I'm listening."

"Check our *twilga* book, and see if we have balances with your holdouts."

I did. "Yes. Quite large ones."

"Good. What you do is use them as a lever. Since you do our shopping, suppose you decided to use all of our *twilga* with the holdouts right now?"

"They couldn't possibly cover that much additional debt. They would have to scramble to arrange extensions, the value of their *twilga* would go way down—it'd hurt."

"Suppose you pointed this danger out to them, but at the same time you offered not to do it—if they chip in on the street paving?"

The idea whirled around under my skull, making me dizzy. I didn't know how to react. It could work. But was it right?

"What . . . what is the *twilga* balance? You supply your *twilga* . . ."

"No, we haven't any *twilga* interest in this at all," Ralphayers said. "We get our debts paid either way. The only *twilga* transaction I see is between you, acting for the town, and the holdouts. The town gets its paved streets, the holdouts pay their share, and their paws stay unmuddy too."

I felt like I had drunk too much fermented milk. By Kraal, it might just be the answer! A whole herd of possibilities for town improvements stampeded past my mind's eye. "I'll give it a try."

We settled the *twilga* for the advice, talked a little longer, then I left. I was anxious to get back to town to try out the humans' idea.

I decided to test it on the most intractible of the holdouts. I found Shrubfur stoking her forge in preparation for working some iron. She took off her leather apron and walked over to me. Her hostile scent arrived first. "Afternoon, Slasher," she rumbled. "You here to harangue me about the paving again?"

"Afraid so."

"Look, I tell you and I tell you. I can't afford it. And even if I could, why waste hard-earned *twilga* on useless luxuries? A bit of mud never hurt anyone."

"That's a very narrow point of view."

She growled. "Are you insulting me?"

"No, of course not," I said quickly. "But . . . Shrubfur my friend, you have

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a problem. I'm here to help you with it if I can."

"What problem?"

"You've run up quite a large debt to the humans for the information about that metal they call steel. I hope you can cover it—all of it—since I'm going shopping for them today."

She bared her fangs nervously. "I . . . I assumed . . . with so many others owing them too . . ."

"That's true, of course. I could use other adults' *twilga* today. The choice is mine."

It took a few moments for the implication to penetrate the dense stuff between her ears. Then she tensed as if about to attack, and I tensed, too. But she managed to control herself. "I suppose the humans won't accept installment payments with interest?" she growled.

"You suppose correctly."

"I could challenge them over this!"

"I stand in their place," I reminded her. "Part of my job."

"I might still win," she said thoughtfully.

"Not likely. But even if you did, you would be known as an adult who doesn't honor her *twilga*. Who would sell to you or buy from you then?"

She just stood there, looking like she wanted to howl in pain. I knew how she felt. Finally she growled, "I agree to pay a share for the street paving. But don't think this ends the matter. You're doing a bad thing. Very bad!"

I quickly got out of range of the reek of her hate, and visited the other three holdouts in turn. The results and their reactions were all the same. Their anger didn't worry me; these things passed.

I was glowing with success as I handled Weighing cases in my stall the rest of the day. Tomorrow I would contract for the paving job and start redeeming pledges.

Which might explain why I didn't notice—then—the paucity of clients, or the groups of adults that stopped talking when I passed, or the whispers at my back.

At sundown I picked up Runt at school and loped for home. I was still lost in thoughts of which brickwrights could do the best and cheapest work, and didn't miss the usual friendly goodnights. Even Irongut's.

We reached the cabin as darkness closed around it. Runt was learning fast; he growled "Mommy" softly and didn't fight as I chained him in the corner on his training blanket.

"Yes, Mommy loves you," I said, scratching behind his ears. "But if you mess off of your blanket again you'll wear it. Are you hungry?"

Runt jumped up and down, and howled.

"Me too. I'll bring something tasty back for you."

The hunting was long and cold. The snow was so deep in the open that I made better time on two legs. I moved through the gaunt leafless trees like a spirit from a ghost legend. I was on the verge of giving up and going to bed hungry when I found and dug out a borer burrow. Not the most delicious meat, but in snow season you couldn't be choosy.

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I was returning to the cabin with two of the dirty little fleshbags for Runt when I heard Irongut's entry cry.

An unexpected pleasure? Our relationship had cooled perceptibly since I started acting for the humans. He was pretty conservative for a young adult, and didn't approve of the changes they were causing.

If this was a romantic visit, I was all in favor. I howled permission, and hurried back to the cabin to feed Runt and run a quick comb through my fur.

The moment he stepped through the doorway I smelled trouble. He wasn't lusty; he was trying to hide nervousness. "Evening," I said lightly. Be careful, I told myself. Something is up.

"Good to see you, Slasher." He went over to the hearth I had just lit. "I haven't caught scent of you much lately. You've been so busy with your creatures. I've missed you."

"Humans, *gorwana*." Love-words came naturally between us now. "And I've missed you too. How's business?"

"Lousy. The new kilning techniques you sold to the other ceramic artisans have almost made me obsolete."

"You can consult the humans too."

His scent turned hostile. "I don't want any unnatural knowledge, not a bit of it. Even if I never sell another pot." He stopped, and tried what he probably thought was a convincing show of passion. "But I didn't come here to argue morality, *gorwana*. I came to be with you." He closed, and started licking behind my left ear.

I backed away. "Okay, it's truth time. What are you trying to accomplish?"

"Huh?"

"Do you think I'm a fresh-caught *tagnami* you can trick? You insult me. You aren't in a romantic mood, so why are you really here?"

"I . . . wanted to talk to you."

"About what?"

"About . . . uh . . . Weighing. You know I'm very interested. I thought we might—"

"Irongut, *gorwana*, you don't get enough practice to be a convincing liar. You're here for a reason you won't admit." I could only think of one subject about which he might feel the need to lie to me. "It's something to do with the humans, isn't it?"

Silence.

"Kraal curse it, Irongut, go home. You aren't welcome on my territory. I'm going to visit the humans, make sure they're okay."

He moved to block the doorway. "No. That's why I came, to keep you out of it."

"Out of what?" More silence. "If you aren't going to talk to me, get out. You won't fight me, but I may have to walk over you if you don't move."

He couldn't outglare me, and finally stepped aside. "Please stay here tonight," he begged. "With me or without me. You can't help the humans."

You could have sliced iron with my anger. "You know about my duty to them. I'm going. If you tell me what I'm walking into, it might help me avoid trouble."

He thought that through, then said in

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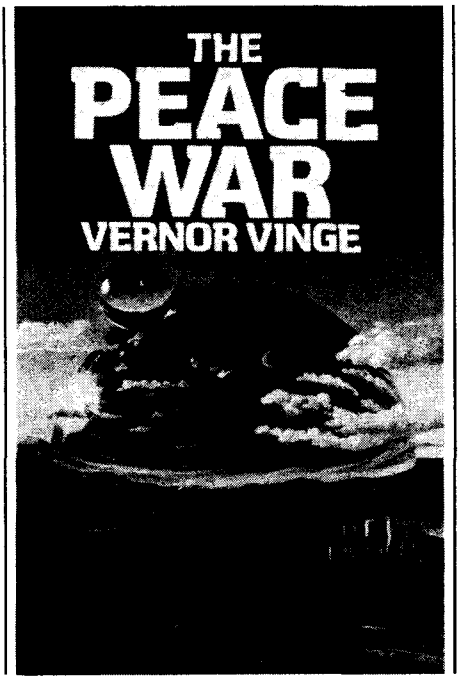

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a low growl, "Word spread quickly about the immoral trick you used to put over the street paving. Many of us feel the humans are the source of this evil among many others. So Shrubfur and a pawful of others plan to visit Coldcrag tonight. For a circle challenge."

Overkill, I thought. Any one adult could kill both humans without much effort; I didn't see the need for multiple challenges, except maybe moral support. "Violating my challenge-right! Skulking behind my back! You thought I would ignore this shame if I had no chance to prevent it! No! I'll buy my honor back with blood, if it comes to that!"

"I—"

"Go home, Irongut." My voice softened. "I forgive you. Your heart is in the right place, though Kraal knows where your brain is."

"What are you going to do?" he asked.

"My job."

Irongut backed out the doorway, reeking worry and sorrow. "The humans are dangerous, and very bad luck. I hope you survive the night, *gorwana*." Then he was gone.

I rushed around the cabin, filling my carrysack with things I would need. I had enough imagination to see the only two possible outcomes of what I had to do. Neither was good. I would have felt ill except for the heat of anger that burned away all lesser emotions.

Unchaining Runt, I left him sleeping on his blanket. "Sleep well, my little furball. Tomorrow it's back to the Wild for you, unless the new owner needs a *tagnami*."

The tears in my eyes dried quickly as I ran at top speed across meadows that were pale white in the moonlight, and through grave-black forest, to the commonland trail.

Even during snow season there was gaunt beauty for the discerning eye: smells of life dying and awaiting rebirth. But my mind was busy adding details to my plan. It depended on my reaching Coldcrag first—a reasonable possibility, since my territory was closer to it than Shrubfur's. Plus the fact that circle challenges usually required a lot of negotiation to settle the individual rights.

I stretched my stride until icicles tore at my lungs, but the snow dragged at my legs. Before long I was panting and aching. Kraal, I *was* getting old!

I sniffed the light breeze, and paused every so often to listen, but I seemed to be alone in the night. The territories I passed were quiet. Was I early, or too late?

I reached the border of Coldcrag still without any sign of the circle challengers. Even in an emergency like this I couldn't enter without the humans' permission—*I* wasn't here to issue a challenge. I howled an entry cry.

Minutes passed. If the deed was already done, I would return home. In the morning I would set out to identify the challengers and regain my honor. But that wouldn't bring the humans back to life. I was beginning to think of them as friends as well as business associates.

The horn sounded entry permission. I must have roused them from sleep.

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Good, so far. I ran up the slope as though demons were on my trail. Maybe there were.

Ralphayers opened the door, shivering from the cold. Pamayers stood behind him; her candle was the only light in the dark cabin. "Is something wrong?" she asked.

"Very wrong. Get your traveling gear, quick. We're leaving here now."

"Huh? Why?" Ralphayers stifled a yawn.

"A group of adults is heading here to kill you two. They may be closing in right now."

"You're . . . you're sure about this?"

"Yes, yes, yes! But don't believe me—stick around and see them for yourself. You'll get to participate in one of our quaint rituals called a circle challenge. You won't enjoy it."

"Why? What have we done?"

"You didn't do it; I did. I listened to you instead of my common sense. No time for this now. Move or stay!"

They had carrysacks filled with equipment for their frequent research trips into the Wild; they stuffed them with food, then slung them over their backs after putting on more of their strange pelt substitutes for warmth. They kept talking to each other in their own language. I poked my head out the door.

The breeze was rolling down the slope, so I heard them before I smelled them. They were on the humans' territory, spread out to prevent escape, and closing in on the cabin clearing. At least seven. I couldn't see them; a broken twig here, a whisper there told me where they were. They weren't being particularly stealthy, since they didn't expect much opposition from the humans.

Time to enlighten them. I howled the traditional trespass challenge, then added, "I'm here! Slasher! I'm here to accept any and all challenges of Ralphayers and Pamayers! I suggest you turn around and slink away before your debt becomes too large to let you survive!"

I admired my bravado. I might win the first two or three challenges, but even my ego couldn't pretend I'd live to complete the circle. They knew it, too. Shrubfur's voice came from the black forest eaves. "Return to your territory, Slasher, while you can. You've been seduced by these evil creatures, but when their influence is gone you'll be one of us again."

"I'm more respectable than any of you! I'm not afraid of new ideas, or in need of a skulking pack when an *adult* would hunt alone!"

That insult ended rational discussion. Howling rose in all directions, coming closer, a din that sent all nocturnal beasts scurrying or flying to safety. The humans crowded behind me, jerking at each cry. "Ready?" I demanded.

"Yes," Ralphayers said. "But what can we do? They're all around. We can't fight them, wouldn't even if we could. And we can't run fast enough to escape"

"Too true. Remember those animals you told me about, horses? Well, pretend I'm one. Straddle my back and hang onto my fur."

"You're strong, but not that strong," Ralphayers said.

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"You better hope I am. Get on."

They did, awkwardly, sitting in front of and behind my carrysack. My legs almost buckled. They were heavier than they looked. But I figured I could still make better speed than their pitiful excuse for running.

"Here we go!" I bounded off the porch and crossed the white-crusted rocky ground away from the cliff and Coalgathering, toward the Wild.

"Where are we going?" Pamayers shouted over the drum rhythm of my four driving legs and the hissing wind.

"Away from the hunters," I gasped. "If we manage that . . . we'll see."

I could have tried to dart between two of the slower challengers. But such a show of cowardice would make us legitimate prey; they would hunt us to the death. Besides, I was mad from tail to snout. If I had to abandon everything I owned except my honor, I would go with style and at least a small victory.

I ran straight at Shrubfur.

She loped out of the underbrush, a black shadowy shape. I would have approached a fight with her cautiously under the best of circumstances; with the burden on my back it was downright crazy. Which I was, a little bit. "Stay right there!" I shouted. "I'm coming with a red welcome for you!"

My scent was so strong I could smell it, rage and death.

The other challengers kept their distance—this was between Shrubfur and me now. She held her ground, tensing to defend and counterattack. She didn't smell the least bit afraid, but . . . maybe . . . uncertain.

The gap between us was closing fast. My back ached. The humans were shouting questions that I didn't bother to hear. Shrubfur had become my entire universe. If she didn't step aside, I was going to claw a path right through her. Or go down trying.

I understood her uncertainty. The still rational part of my mind was counting on it. She wasn't sure she could beat me, and her reason to try wasn't very strong—her challenge was against the humans. And they were abandoning their territory under challenge. It rarely happened, but it was as effective a banishment as death.

Her snarling face loomed in front of me. I spread my jaws to tear out her throat, and wondered where her claws would rake me.

Then she was gone, a stride to my right, and I hurtled by. The scrawny woods wrapped darkness around me. The snow under my paws thinned to frozen patches, and plant-smells cleared the evil reek from my nostrils. The humans were still shouting questions.

Just as I thought we were clear, Shrubfur apparently regretted her indecisiveness. Her howl was promptly answered by the other challengers. Running legs pounded the ground behind us. The hunt was up.

My rage began to cool, allowing me to concentrate fully on the agony each stride wrung from my breaking back. But it would have to agonize even more if it weren't to stop permanently. "Are you two okay?" I shouted to the humans.

"Yes!" Ralphayers answered. "What

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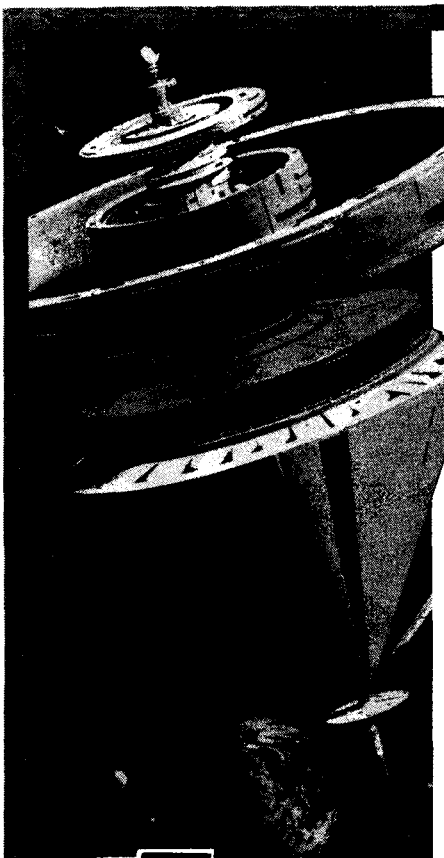

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happened back there? Were you going to fight?"

"Later . . . !" I gasped. "They're on our . . . trail! Have to . . . outrun them! Need all my strength!"

"You can't possibly outrun them, not while carrying us!"

That deserved and got no answer. Of course I couldn't, but there was no honorable alternative to trying.

I was heading upslope, toward a low pass over the mountains and into the Wild. The stunted trees and bushes became more sparse, giving way to snow-covered granite. I gasped with each stride. My running was ragged; I could hear and smell the hunters on both sides and behind, closing in on us cautiously.

I hadn't expected pursuit, and had no clever scheme to escape. But I kept doggedly at it, ignoring further questions from the humans. The summit of the pass was just ahead now. If I could make it through, at least I would be running downhill.

The hunters were within a ten-stride or two of bringing us down. My back hurt so badly I almost looked forward to it.

Suddenly and dramatically in the wan moonlight, the white trail curved downward. I saw the Wild below, tree-tops and rivers and broad meadows reaching to the horizon. I started down, staggering, hindknees buckling.

It took me several moments to realize that the humans and I were alone on the downward trail. The hunters had stopped at the summit. I could feel their eyes even though I was beyond their view. I pulled up slowly on trembling legs. "Off!"

They scrambled onto their own legs. "Are we safe now?" Pamayers asked. "Why did they stop?"

"Safe from them, yes. Seems they just wanted to chase us out. But we're in the Wild now, so keep a sharp lookout. There are many dangerous creatures here, large and small, ones we've purged from our territories."

I continued down the trail—a rough path blazed by Travelers as well as mothers-to-be—and the humans followed. Walking, not running. I felt light enough to glide, but my back and legs still ached.

"Can you tell us where we're going now?" Ralphayers asked.

I paused. "There's a lot I could say in answer to that. Our immediate need is for a safe place to sleep. I don't know the Wild well; I rarely have business out here. But I remember a place near here that should do."

"What happens to us tomorrow?" Pamayers asked.

"I don't know," I snapped, short-tempered in my pain and loss. "This is a new experience for me too. So far I've been concentrating on keeping us alive tonight."

"Is there any hope we'll be able to return to Coalgathering?"

"No. The circle challenge still stands. And we would find the same kind of trouble if we tried to establish ourselves in another town. The news of what happened tonight will spread fast, and we would be considered undesirable neighbors wherever we went. That leaves a

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pair of choices. Turning Traveler or Wilder."

"Traveling might suit us," Ralphayers said. "We could learn more that way. But I'm not sure I understand the concept completely. Travelers are artisans, savants, craftsmen, explorers *et al* who wander from town to town. But how do they fit into your social and economic systems?"

"They're somewhat disreputable," I admitted, "since they don't share our need for territory. They earn a bit of *twilga* in a town, buy what they need and move on. They eat, drink and sleep in the Wild. Frankly, I don't think you two would last long. But if that's your choice, I'll help you as much as I can."

The humans jabbered at each other. I looked up past bare branches at the cold stars, and felt empty. I was no Traveler. I had to have land of my own under my paws, a fixed place in the universe. But my territory would belong to someone else tomorrow.

"You're right," Pamayers said to me. "We wouldn't survive. What about the other possibility?"

"Wilders," I growled. "Even lower than Travelers. Cowards, criminals, perverts, eccentrics—anyone who can't accept the customs of society—flee into the Wild, living scarcely any better than truly wild adults. But I don't see a third choice for us."

"You mean we just find a likely piece of land and take up residence?" Pamayers asked.

"*Two* territories," I reminded them sharply. "Ones with adequate food and water won't be easy to find out here. That's why it's the Wild. But yes, we claim them, challenging the current owners—quality land will almost certainly have a Wilder or wild adult on it. If we win, the territories are ours. I'll have to fight for you, of course."

More jabbering. "That plan sounds more suitable to our needs," she said. "With the tools in our carrysacks we should be able to build cabins, hunt and grow food, make clothes . . . But none of us are in any shape to decide our future tonight. Let's take it up again in the morning."

"I agree," I said. For awhile we walked in weary silence. We were on an icy rock shelf following a cliff face. Below the bare slope descended to the eaves of a forest, all dark and indistinct shapes.

"Why?" Ralphayers asked so softly that I might have thought he was talking to himself, except that he wasn't using his own strange language.

"Why what?" I responded.

"Why all of this? What did we do wrong, to be driven out like this? I thought your fellow townsfolk were beginning to accept us."

"Some were," I agreed. "But I made a bad error in judgment. I used your idea to put over the street paving, and it convinced some of the town conservatives that your notions about cooperation are dangerous. Ergo, the challenge."

"But . . . but cooperation is a cornerstone of any social system. Your individualism has held back your rate of progress. There is so much you just can't *do* without group effort."

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I growled. "For a savant you aren't very quick on the uptake. We may not have the herd instinct of your kind, but we do cooperate. We do it in our own way. As for progress . . ." I stopped. All the times I had cursed the hindbound conservatism of my fellow adults, and here I was babbling their cant like Shrubfur or Irongut. Was my loss turning me against my own beliefs—and the humans?

"You're right," Pamayers said, "and we were wrong to suggest what we did. We're here to learn your mores, not change them."

"I was the one who bought your idea, and tried it. A Weigher should have known better. I was . . . tempted. And I've been properly punished. So let's not talk about this any more tonight."

More silent walking brought us to the place I remembered. A cave in the limestone of the cliff. Not much of a cave; more like a cabin-sized indentation, with fallen rocks piled in front like a low fence. I sniffed to make sure it didn't have a current inhabitant. It didn't. "Here's your cabin for tonight. Safe from predators, and some shelter from the cold."

"Aren't you joining us?" Pamayers asked.

I shuddered. "I'll sleep out here as a guard. The cliff is all the shelter I need."

The humans crawled over the rubble into the cave. They used their odd non-burning lamps to examine it, and reported it was messy from animals that had laired there, but habitable.

They got the cave cleaned up quickly, and went to sleep. I was just as tired, but I had trouble falling asleep. I wasn't as impervious to the cold as I had alleged, and even well away from the cave entrance I could smell the humans.

But the worst was the stress of having no territory, of sharing this place with others. I had to stay with them to keep them safe, but there wasn't any precedent for adults sharing a territory . . . there was my out. They weren't really adults; they were more like *tagnami* I was raising. Not a perfect analogy, but good enough to let me finally sleep.

I woke up cold, stiff, and momentarily disoriented. When memory poured back between my ears, I managed to feel even worse. I just lay there on the leaves I had piled to cushion the bare rock. I watched the stars slowly fade as dawn came. I heard the forest sounds and the loud breathing of the humans. The smells were unchanged from the night before.

I felt unnaturally lethargic and hopeless. There were things that needed doing, I knew intellectually, but emotionally I couldn't stir up any motivation to move. The wan winter sun rose to warm me a bit. It looked like it was going to be a clear day.

The humans finally came out of the cave. They looked as worn out and haggard as I knew I must, and I was glad I didn't have a mirror to see. "Good morning," Pamayers said with a try at cheerfulness.

I creaked up onto my hindlegs and

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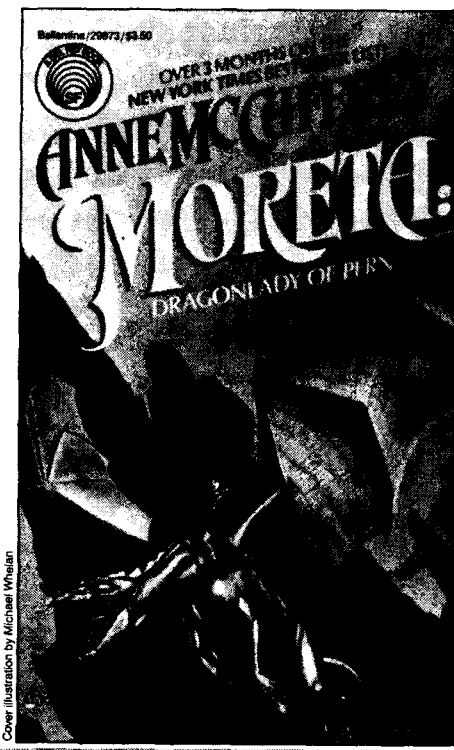

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joined them. "If you say so. At least we have good weather. We'll need it."

Ralphayers nodded. "Well, Slasher, do we stay here or move on?"

I thought as I paced the kinks out of my joints. Finally I said, "This land isn't very good for game, though there is water. We'll want better for permanent territories. But I think we should winter here. I'll hunt game for all of us. Can you fix the cave up as a suitable temporary home?"

"Not easily or quickly, but yes. We have some tools. We can wall up the front, put in a simple hearth, a floor, build some furniture—"

"I suggest you get started then," I said curtly. "I'll have to protect you until you have a secure home, and on top of everything else that has happened I must disgrace myself by sleeping on your doorstep."

Ralphayers paused, then said, "I think I understand your problem. With luck we should be able to get the wall up today."

"That would be good news," I growled without conviction. "While you're at it, I'm going to hunt our breakfast. After that I'll scout around for a nearby site for my own winter haven. There are supposed to be more caves further south along the cliffs. Tomorrow we can run the bounds of our new territories and mark them."

"Is that important out here?" Pamayers asked.

"We're still civilized adults, Kraal curse it! I won't start behaving like an animal, and neither should you!"

They looked at me strangely. Kraal take them both, *I* had nothing to apologize for. I told them how to find the nearest mountain stream, warned them to keep watch for direbeasts and wild adults, and loped down the slope into the grim woods. I felt indecently glad to be getting away from them, if only briefly.

The strongwood giants and squat underbrush became thicker as I followed a game trail down toward the plain. The forest was, I knew, only a thin strip hugging the mountain range. Beyond were rolling meadowlands buried under snow and bereft of game.

I had half-hoped the familiar routine of the hunt would snap me out of my funk. But it didn't.

Much as we pride ourselves on our individualism, scratch us and you will find underneath creatures as socially interdependent as any hiving insect. I had been torn from my secure place in Coalgathering's social structure. In one swipe of the claw I had been disgraced, lost my territory and *tagnami*, and been forced into exile. I was already beginning to feel *lonely*. The humans were intelligent and overly friendly, but they weren't adults. We had too little in common.

Kraal curse the day they had dropped into my life to destroy it!

No, it wasn't fair to blame them. They had provided the opportunity, but I had seized it to trample tradition and hurt others. Yes, hurt! Only now was I beginning to see, through their eyes, how wrongly I had dealt with them. In the arrogance of my convictions I had forgotten their right to their own. For

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that there had to be *twilga*, and I would pay it for the rest of my life.

I leaned against the slick black bark of a forest giant, and for the first time since the day I killed my father I cried.

How long I cried I don't know. What stopped me was a scent on the soft morning breeze. A half-familiar scent. A dangerous, hostile scent. Even in my present state it snapped me back to animal awareness.

A wild male adult, coming this way. Not a Wilder who had turned his back on civilization, but a cub who had never been brought in to become a *tagnami*. As an adult he would be a very successful predator, cunning though uneducated, a winner in the hard battle for survival in the Wild.

Worse yet, I could tell he was in rut. He wasn't looking to kill me for trespassing on his supposed territory. Not this time.

My nape fur should have risen in outrage, and I should have hurried to challenge and gut the savage for his effrontery. As a *tagnami* I had heard the dark tales of Wilders coupling with wild adults, but I hadn't really believed them. Some things were too disgusting to be conceivable.

But I didn't move.

He crept cautiously from a stand of iceberry bushes. At this close range he had to know I didn't share his lust, but being a savage he wouldn't care. He was a magnificent physical specimen; huge, about Irongut's age, and scarred so that his pelt looked like a badly made quilt. He stank from the lack of a recent bath.

Still I didn't move.

This would end it. The body and the brain would go on, fulfilling an unwanted obligation. But the soul would be extinguished. No pain, no loss, no loneliness. All I had to do was yield.

I made myself give off an acquiescent spoor, turned away, crouched low, tucked my tail to the side to save it from his brutal passion, and spread my hindlegs for him.

The sun was well past zenith and starting toward its evening rest when I loped out of the woods and approached the humans' cave. They were hard at work fitting young strongwood trunks they had cut and trimmed into a wall blocking up the cave mouth. They heard me and, dropping their tools, ran to meet me.

"Where have you been?" Pamayers demanded. I thought I was beginning to master some of their odd facial expressions, and she seemed worried as well as afraid for me. But their feelings meant nothing to me now.

"I've been doing what I should have done a long time ago. Thinking. Not just reacting to events." I paused. "I've changed my mind. I can't be a Wilder."

"What do you mean?"

"Just this. I'm returning to town. Now."

Ralphayers spoke before Pamayers could. "But last night you said we couldn't go back. You said the challengers would try to kill us."

I nodded.

"You've thought of a way around the challenge?"

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The will to do something—anything—was like the glow of fermented milk spreading through my body. Recent memory still burned like a hearthfire, but I would again be true to my name. "I'm going to accept the challenge for you. I'll complete the circle, if my skill and luck last."

"You can't win a half dozen or more fights in a row!" Pamayers blurted. "What's wrong with you? Are you trying to commit suicide?"

"Why I do it is my own business. Still, we have a business agreement. If you come with me, I'll do my best to keep you safe."

"How are you going to manage that if they kill you?"

"If you want to find that out, come along. But you don't have to. We can terminate the agreement. With your strange talents and tools you might make a life as Wilders."

"Without your help we won't survive the winter," Ralphayers disagreed. "Starvation, attack, exposure—take your choice."

They were trapped, but so was I, and I had no sympathy for any of us. "I'm leaving now. If you plan to hold me to our agreement, get your sacks and come."

I walked slowly to the cliff trail that had brought us here. Behind me I heard hasty packing and paws running to catch up. They fell in on either side without a word.

The silence suited me. I didn't want to have to explain further, or to try. When you have lost everything you have to lose, right down to your self-respect, you reach at last a kind of peaceful equilibrium, the firmness of rock bottom. I wanted to enjoy it while I could.

I set a fast pace up to and over the pass, and the humans were hard put to keep up. They talked to each other from time to time. Starting down, I took the most direct commonland trail to town.

I wanted to arrive before the adults started home for the day. The sun hung low over the treetops beyond the river when I walked through the South Gate on my hindlegs, flanked by the humans.

I expected the whole town to know what had happened, and I was right. As I walked along Savant Street toward the challenge lawn, most adults and *tagnami* stopped whatever they were doing, stared at us, and began talking excitedly among themselves. I knew what they were looking forward to; I didn't plan to disappoint them.

No one spoke to me, but many followed us at a safe distance. Others spread the news, like the ripples created by a rock tossed in the river. We reached the reddish-purple groundplant, dumped our carrysacks, and went to the middle of the challenge lawn.

The late afternoon was golden with shafts of light coming through the treetops. Bloodlust and excitement saturated the air, which was dry but hard-edged with a chill. A beautiful day for fighting. Hundreds of adults and *tagnami* soon ringed the lawn—most of the town.

"Don't say or do anything unless I tell you to," I whispered to the humans.

Pamayers opened her mouth, but then closed it and touched my shoulder.

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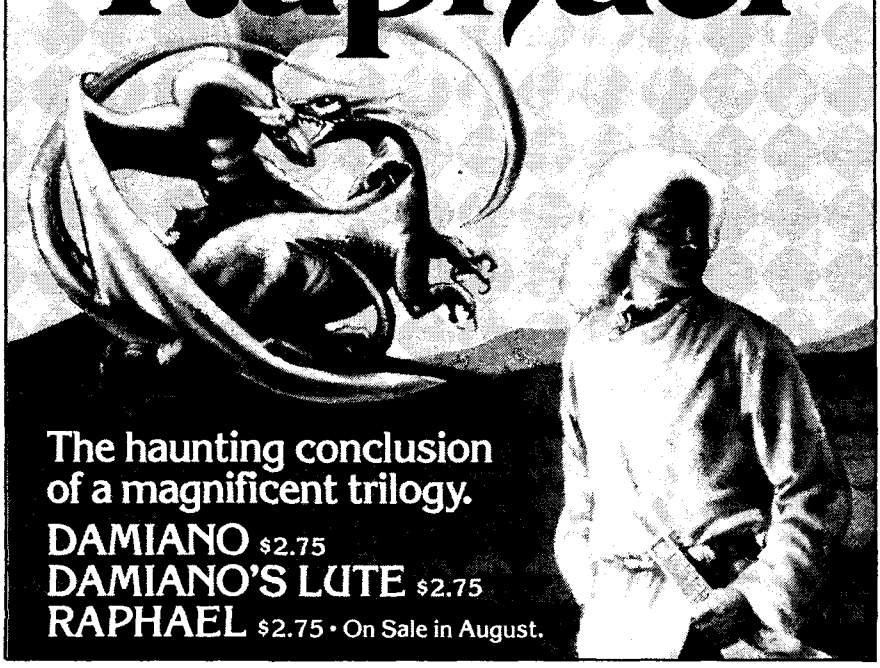

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Strangely, I found the gesture reassuring rather than offensive.

The onlookers suddenly became silent. From seven places in the ring adults stepped forward. I recognized them all by their scent. The circle challengers. I faced Shrubfur.

"I'm glad to see your courage has returned," Shrubfur growled. "One thing I never thought of you was that you were a coward."

"The grievances between us have become complicated," I said in a calm tone. "The humans and I are eager to settle them. I suggest that we get a judgment from the Weigher. You do have a new Weigher, don't you?"

Shrubfur laughed deeply. "That we do. One more to my taste than his predecessor. I wonder if you'll approve. Ah, here he is now."

Irongut stepped through the ring onto the lush lawn.

I wasn't surprised. I had known about his interest for a long time. Nor, knowing his feelings on the subject, could I expect any help from him. Love wouldn't stop him from doing his duty any more than it would me. He would be fair, but fair according to his own beliefs.

His expression when he looked at me was grim, but I smelled the scent of concern, too. "I'm the Weigher now," he said to me. "Are my services needed here?"

If my scheme went wrong, I would have to fight him. I felt old. Too old.

Shrubfur growled, "Ashpelt, Crier, Fisheater, Shortlegs, Treeback, Stripedfur and I issued a circle challenge to the creatures called Ralphayers and Pamayers. Slasher intervened on their behalf. They fled from us and abandoned their territories. Now they have returned. We are reposting our challenge." The other six added their approval.

"Will you accept a *twilga* decision from me to settle your grievances?" Irongut asked.

Before I could speak Shrubfur answered, "No, this is a blood dispute," and the others agreed.

Irongut turned to the humans. "Then you must fight. Which of you will accept first?"

"No!" I shouted—everybody had to hear this. "I claim this challenge is unjust! I want the Weigher to judge if it's proper!"

For something as unusual as a circle challenge it was a fair request. The challengers agreed smugly, and we all entered the *twilga* for Irongut's Weighing in our notebooks.

"Why do you say it's unjust?" he asked.

"Because these adults have no legitimate grievance against the humans."

"No grievance!" Shrubfur howled. "They have spread strange ideas that damage our businesses. Worse, they have seduced you so that you think like them and deal dishonorably with your own kind. Everyone knows about the perverted trick you used on Fisheater, Shortlegs, Treeback and myself."

"Yes, *my* dishonor! I don't deny it! But the humans have done none of you any harm. They sell knowledge that improves our trades, sciences and arts. Many here have bought from them, and profited. If you refused the chance to

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improve while your competitors didn't, whose fault is that?

"It's nothing less than cowardice to try to put the blame on others for your own mistakes. Knowledge isn't evil, but it can be used for evil. If it is, blame the user. Surely you aren't claiming mere words can turn a good adult bad. If so, you're accusing all of us of being so weak-minded that we can't control ourselves."

I stopped, because my well-planned argument was having the desired effect. There were hostile scents and growls among the onlookers, directed at Shrubfur. Many of them had done business with the humans and hoped to do more. Moreover, accusations of cowardice and stupidity cut to the bone.

Irongut took a long time thinking, then said, "Slasher has made some valid points. I don't see that you have a legitimate grievance against the two creatures."

Tremendous relief surged through me. I wouldn't have to fight Irongut.

The challengers plainly realized how bad they would look if they tried to pursue the matter. Nor did any of them seem inclined to fight Irongut over his decision. "I accept the Weighing," each of us said in turn.

Irongut turned to me, his expression even grimmer. "But you've as much as admitted that their grievance against you is valid. You'll have to complete the circle if you can."

Shrubfur smiled broadly.

I motioned the humans to join Irongut at the edge of the lawn, then I dropped to four legs. Shrubfur slunk toward me slowly, also on four legs. Her pelt glistened like water in moonlight. "I hope you aren't going to run away again," she growled.

I returned her smile. "No. I'm going to fit you with a second mouth just under the first."

The preliminaries out of the way, we closed in on each other. The onlookers' conversations stopped as though cut with a knife.

I wanted Shrubfur's life. Whether I then fell to the second, third or fourth challenger didn't matter; she had chosen to make herself the symbol of my disaster. But it wouldn't be easy. She was a paw taller than I, and a mass of muscles from her trade. In age and quickness we were evenly matched. Well, maybe I had the edge in cunning. Maybe.

We circled warily, sniffing to check each other's mood. Shrubfur was hot with anger, but under rigid control; a good fighting attitude. I had no warning when she charged.

She leaped over me, a flashy but effective move. Her claws raked at my back. But I wasn't there—I had dropped to my belly, rolled and crouched. I tried to hook one of her hindlegs with my tail, but missed.

I swung around in time to meet Shrubfur's second attack. She dove at my left side, taking away a mouthful of fur and flesh. The wound bled, and hurt, but it would take a lot of nips like that to drop me. I sank a claw into her left foreleg and opened a deep slash. Her eyes glazed momentarily.

I jumped and came down on top of

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her, grappling with my claws. She rolled across the groundplant trying to knock me off. I hung on as long as I could, then jumped free.

I almost made it. She curled her tail around me, and bit into my right hindleg before I could squirm away. The pain was like a band of molten metal. I swallowed a howl of pain; Kraal curse it if I would shame myself any further.

We wrestled across the lawn as she gnawed at my leg. I had only a few seconds left to save it. Arching until I could feel my spine creak, I swung a foreleg back and down, and caught the end of her snout. Red blood spurted. During her momentary distraction I yanked my leg free.

I stood and faced her, wobbling a bit. Our pelts were matted with blood. We charged each other. She bit deep behind my neck and tried to grind through my right shoulder blade. I couldn't hold in a whimper, and a gray fog obscured my sight.

But, sure of her victory at last, she neglected her defense for less than a second. I hit the sides of her head with two closed paws as hard as I could. She dropped at my feet, stunned.

I reached down with my claws to keep my promise.

And stopped.

I stared at Shrubfur's bloody body, and felt dizzy with sudden insight. Thoughts flew through my mind. At least she would be dying true to her own beliefs, while I had clawed mine to shreds. I would die, and the humans too—without me they would soon ignorantly commit a fatal mistake. Their valuable knowledge and, yes, their even more valuable notion of mutual gain through group effort would be lost.

I had been only half-wrong, but too proud to bend rather than break. Now I understood. Too late; my course was set.

Or was it? I wasn't an animal or a wild adult. I was a Weigher, with a lifetime of accumulated experience. I thought hard and fast, searched my memories, fitted ideas together like puzzle pieces. . . .

A lot went on during the three or four seconds that I crouched over Shrubfur. Then I stood up slowly. Everyone stared at me in rapt silence, eager for the kill, wondering at my delay.

I knew what I had to do, but it still hurt like a doctor's scalpel. Shrubfur coughed. She was beginning to wake up. I took my *twilga* notebook and dropped it beside her. My belt followed it. I was naked.

After a moment of shock, a hundred whispers made the ring of onlookers buzz. The reek of disgust made me gag. Better get used to it, I told myself.

Irongut's scent and expression were unreadable. This situation was an extremely rare one, but he knew his Weigher lore. "The challenge is settled," he said, then turned and walked away. The ring was breaking up as adults and *tagnami* headed back to their stalls. Their eyes avoided mine. Shrubfur staggered off with my former property and a confused look.

The humans ran to me. "How badly are you hurt?" Pamayers demanded.

"I'll live."

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"What happened?"

Each word hurt. "I surrendered to Shrubfur. My territory, my *twilga*, everything I owned is hers now."

A long pause. "Why did you do it?"

"To survive. I have work to do, more important than my property or even my honor."

Another pause, then Ralphayers said, "I think we understand. But what will you do without a territory or *twilga*?"

"I won't have to do without either. It's time for us to settle up for my services yesterday and today on your behalf. Saving your lives should be worth the price of a modest territory and the basic necessities."

"Of course," Pamayers said quickly. "As long as you include medical treatment on the top of your list. You're losing a lot of blood."

I swayed, and the gray fog was thickening. "Okay. Let's go. We don't have much time before dusk. We'll want to stay out of town for a few days, let things calm down."

If I could find adults willing to do business with me. I was publicly labeled a coward. No self-respecting adult would want to stain his pelt with my blood. I had lost all of my friends except the humans, and all of the respect of my fellow adults. Agenting the humans' knowledge would be my only trade; Weighing and all other professions were closed to me. In time I might win back some friends and respect, but for now I would have to cling precariously to the bottom rung of the social ladder.

The sun had gone to ground beyond the river, and the day was ending quickly under heavy clouds. I was finishing up a third day of repairing the dilapidated cabin of my new territory. I put away my tools, and tried to ignore the throbbing of my bandaged leg, side and shoulder.

I was about to hobble into the stunted hillside woods and try to bring down dinner, even more of a challenge due to the meager game stock, when I heard a familiar howl for entry permission.

I trembled from surprise as I gave permission, and rushed inside the cabin to run a quick comb through my pelt. Why was he here? Fears and hopes fought in my mind.

I met Irongut on the porch—the cabin wasn't ready for visitors yet. He looked well, with a more mature self-control. The responsibilities of Weighing seemed to agree with him. I felt a twinge of loss, but I was also proud for him. I tingled like a *tagnami* in cublove. Since the fight my moods had been swinging wildly.

"I'm glad you came," I said simply.

"I want to talk to you about what happened." I couldn't determine his attitude by sight or scent.

"Okay."

"At first I couldn't understand your surrender. I despised you for it, like everyone else, and hated you for not being the adult I loved. But the not understanding hurt me. I kept worrying it in my mind."

"You could have asked me. I would have explained."

"That didn't occur to me until after I figured it out. At least I think I have.

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You haven't given up the evil human notions that caused all this, have you?"

I took a deep breath. "No, I haven't. But I won't be forcing them on anyone. I've learned my lesson."

"Thank the gods for that. But why this fanaticism over something that only causes trouble?"

I looked up at the clouds, and the unseen stars. "The humans came here from another world. They've accomplished so much. We squabble over the smallest step forward, killing each other instead of working together to improve our lives."

"It's our way."

"It's stupid and wrong. We're intelligent beings; we can change, grow. The knowledge I'm agenting for the humans will begin the change, since much of it will take group efforts to implement. But the key is the philosophy of cooperation itself. We're explaining it to all of our customers, and they arrive from farther away every day. Travelers take the knowledge and new ideas and skills with them, telling tales wherever they go. Eventually the philosophy of cooperation will spread everywhere. Its clear advantages will bring about gradual acceptance, without any force being needed."

"I don't agree," Irongut said, frowning. "You underestimate the deep roots of our morality."

"Morals change to match changing social conditions. I read that once in a history text. Don't worry, *gorwana*, the change will be a slow one. We won't live to see much of it."

Irongut was quiet for a long time. "I still feel it's wrong. If we change to become like the humans, then we'll no longer be ourselves. I'll argue against it, and fight against it if necessary."

I laughed. "You can't fight ideas. But you should try if you feel you must. At the least, you can remind me not to be overzealous."

"I will. I . . . don't want you hurt anymore."

My heart pounded under my furry chest. "I was about to go and look for some dinner. Will you hunt with me, *gorwana*? Then we can come back here and build a nice warm hearthfire?"

I smelled his answer before he spoke. "Of course. I still love you."

Together we bounded from the porch, and ran like shadows across the new-fallen snow to the forest eaves. ■

● The future cannot be predicted because it cannot be deduced; the future is emergent, stochastic, hidden from us be complexity; it comes to be synergetically. Therefore, it may be guessed, envisioned in part, by the imagination, which also moves by the process of emergent creation. But, we'll only know later if the guess has grasped any part of the truth.

George Zebrowski, "Herding Words: A Journal"

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THOSE HALOGEN BREATHERS

Chlorine-breathing aliens have lost much of their former favor with science fiction writers because of scientific developments which made them look unlikely. But maybe we haven't looked at all the possibilities!

Stephen L. Gillett, Ph.D.

The alien was humanoid in form and clad in a metallized space suit that glistened and shimmered as it caught the light. Through the clear helmet, the alien's features were blurred by a greenish mist . . .

Fluorine and chlorine breathers are old SF standbys. But is a biochemistry based on chlorine or fluorine breathing reasonable? And if so, under what circumstances? Let's look at some of the constraints on critters that would breathe these two elements.

Fluorine and chlorine are the two lightest members of the halogens (Greek, "salt-former"), the elements that comprise Group VII of the Periodic Table. All the halogens are nonmetals, and they are strongly electronegative; that is, in forming chemical compounds they accept electrons from other elements. I'll discuss only fluorine and chlorine as "breathing elements," because they're gases at ordinary temperatures (at atmospheric pressure, the boiling point of

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fluorine is -188.1°C, that of chlorine −34.6°C), because they're the most electronegative (hence, they will release the most energy when "burned" with food) and finally, because they are the most abundant.

Before discussing metabolisms that could employ the halogens, let's review our own. We breathe oxygen—we all learned that in kin'ergarten. But why? The pat answer invokes photosynthesis: Green plants use the energy of sunlight to combine carbon dioxide from the air with water to form sugars. Oxygen, O_2, is released as a byproduct, and the sugars are used as starting points to synthesize more complex compounds. Animals then breathe in the oxygen to oxidize food ultimately derived from plants. Energy is released, and the waste products are carbon dioxide and water to begin the process anew.

All of this is true, but begs the question. Why should photosynthesis involve oxygen? What is there about this cycle that caused it to be favored by evolution? Let's dig deeper. We'll find that the answer lies in a fortuitous combination of chemical properties and nuclear physics.

Earthly life is carbon-based life; carbon, because of its unique ability to link to itself to form long branching chains, is the basic structural element in biochemistry. Other atoms are attached onto the carbon framework, the most abundant being hydrogen, but with substantial oxygen and nitrogen, some sulfur and phosphorus, and a few other curiosities. Terrestrial biochemistry is also aqueous chemistry; nearly all the reactions take place in liquid dihydrogen oxide—water. Water solution provides the mobility necessary for the reactions to occur.

Note that so far I haven't mentioned *free* oxygen. Basic terrestrial biochemistry does not involve free oxygen; in fact, it is poisoned by O_2. The most primitive terrestrial microbes are "obligatory anaerobes," which derive their energy from "chemosynthetic" reactions such as the fermentation of glucose into lactic acid, or stranger paths such as the reduction of sulfate to hydrogen sulfide. Even now, the cell nuclei of higher life forms must be shielded from O_2.

So how did O_2 enter the picture? At some point, a primitive photosynthetic organism, probably a cyanobacterium (cyanobacteria were formerly, and inaccurately, termed "blue-green algae"), "learned" to use solar energy to split water molecules, making sugar and releasing oxygen. Why on Earth would it be evolutionarily favorable for an organism to expose itself to a deadly toxin like oxygen?

Well, the main incentive for photosynthesis was to get hydrogen. Hydrogen is a major ingredient in organic compounds, and water is the major reservoir of hydrogen on our planet. Other sources, such as volcanic gases (which contain H_2S) and dead organic matter, are very limited, but water is for all intents and purposes infinite. Therefore, at first the oxygen was just an unwanted, toxic byproduct.

There was an important spinoff, however—if you can learn to use that nasty, corrosive stuff, it yields big dividends

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in energy. The energy yield from such processes as fermentation or sulfate reduction is small. For example, the fermentation of simple sugar into lactic acid yields only 47 kilocalories per mole of sugar. Oxygen is big-league; burning the sugar with O_2 yields 682 kilocalories. In fact, the prodigious quantities of energy available from oxygen respiration is probably what made complex, multicellular life forms (like us!) possible. Anaerobic processes couldn't begin to cover the energy overhead of a multicellular organism.

The O_2 molecule is also quite stable, another feature that makes oxygen good as a breathing gas. The two oxygen atoms are linked by a double bond, and it takes a substantial amount of energy to break that bond so that the oxygen can react with something else. This high "activation energy" allows the reaction of oxygen to be controlled easily, so at ordinary temperatures organic matter doesn't burst into flame spontaneously. O_2 can accumulate in the atmosphere, and aside from occasional conflagrations like prairie fires, be available for respiration.

There's yet another factor: Hydrogen oxide is well suited for its role as the biochemical solvent. Not only are its chemical properties exemplary, but water also has a large liquid range and an exceptionally high boiling point, so oceans won't freeze or boil because the weather changes. Both these properties stem from "hydrogen bonding": fleeting, weak bonds are constantly forming and breaking between a hydrogen atom in one water molecule and the oxygen atom in another. Water is more difficult to vaporize because of the extra energy needed to break the hydrogen bonds.

Finally, the clincher: Oxygen is extremely abundant, being by far the most plentiful electronegative element. It makes up over 50% of the Earth's crust by weight, and over 90% by volume; to an excellent first approximation, the Earth's crust is made of oxides. It was inevitable that essentially all of the Earth's carbon and hydrogen would wind up as CO_2 and H_2O, since both hydrogen and carbon have strong affinities for oxygen. (Fortunately, most of the Earth's CO_2 has subsequently been locked up in crystal rocks as carbonates. Had the CO_2 stayed in the atmosphere, Earth would have become a duplicate of Venus, with a thick CO_2 blanket maintaining surface temperatures high enough to melt lead.)

To understand why oxygen should be so common, we have to digress into nuclear physics. (And we started out talking about possible alien biochemistries—science is really very interrelated!) Natural oxygen is composed of three stable isotopes, ^{16}O, ^{17}O, and ^{18}O; of these, ^{16}O is far and away the most abundant. Out of every 10,000 oxygen atoms in the solar system, 9,976 are oxygen-16; we could eliminate the two rare isotopes and not even notice.

Therefore, the extraordinary abundance of oxygen reflects the extraordinary abundance of oxygen-16. In part, this abundance could be predicted from what's called the "odd-even" rule; nuclei with an even number of protons *and* an even number of neutrons are more stable, and hence more abundant, because nucleons (protons and neutrons,

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collectively) like to occur in pairs. (And stable nuclei with an odd number of protons *and* an odd number of neutrons are almost nonexistent—but more on that presently.) However, the odd-even rule is not the whole story. Oxygen-16 is just an exceptionally stable nucleus, because eight is a "magic" number that corresponds to complete filling of a "shell" in the nuclear structure. ^{16}O has two complete shells: eight protons, and eight neutrons.

It's a conspiracy. Because of a quirk of nuclear structure, oxygen is the most common electronegative element. Oxygen also has a strong affinity for carbon, the element of life; you are forced to deal with oxygen if you would separate carbon. Finally, water is a nearly ideal biochemical solvent.

O.K., now let's look at fluorine. Fluorine atoms contain nine protons, and only one isotope is stable, ^{19}F with ten neutrons. This single isotope is about one-third as abundant as ^{17}O, the rarest isotope of oxygen. Already we can see problems a-brewing; fluorine is *rare*.

Worse than this, fluorine is ferociously reactive. It is the most electronegative element known, and replaces oxygen in its compounds at slight (or no) provocation. Under proper circumstances, fluorine will combine with *everything* except the three lightest noble gases, helium, neon, and argon. It's gonna be hard to force F_2 to accumulate in an atmosphere.

Hmmm. Well, before worrying too much about this scarcity, let's see if fluorine's chemistry is worth pursuing. If we follow a strict analogy with oxygen, fluorine breathers will inhale fluorine, using it to oxidize (!) food to CF_4 (tetrafluoromethane or carbon tetrafluoride; analogous to CO_2) and HF (hydrogen fluoride, analogous to water). In turn, the biochemistry will take place in liquid HF rather than water—we're forced to this by more than just analogy, because free fluorine burns water! Thus we want oceans, lakes, rivers, etc., of hydrogen fluoride. On strictly chemical grounds, is any of this reasonable?

Hydrogen fluoride is indeed chemically and physically similar to water. Like water, it is strongly hydrogen-bonded, so that it also has an anomalously high boiling point and long liquid range. Under one atmosphere pressure, liquid HF boils at 19.5°C and freezes at -83.1°C. The melting and boiling points are lower than water's, because although the hydrogen bonds in HF are stronger due to fluorine's higher electronegativity, there are only half as many hydrogen atoms per molecule. Still, as with water, the liquid range is about 100°C.

(As an aside, the hydrogen compounds of the three lightest electronegative elements—nitrogen, oxygen, and fluorine—are all rather similar. These compounds, ammonia (NH_3), water, and HF, respectively, are all strongly hydrogen-bonded, with high boiling points and long liquid ranges. Liquid ammonia is a "traditional" alternative solvent for alien biochemistries, and on chemical grounds HF is equally reasonable.)

What about the energy yield of oxidizing food with fluorine? As you might

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guess, fluorine respiration looks possible (although on a per-atom basis you get more energy by oxidizing carbon to CO_2 rather than CF_4). Also, CF_4 is a gas, like CO_2; this makes it feasible to exhale!

Further, the biochemistry must be colder than Earth's because of HF's lower boiling point. Lower temperatures will make fluorine easier to tame; reactions that occur spontaneously at 25°C may require encouragement at −50°C. Still, living tissue and natural organic compounds will be nearly perfluorinated, with fluorine attached to carbon at molecular sites where hydrogen would occur in Earthly life. F_2 has no double bond that must first be broken, so that something has to be done to make organic matter less flammable. Unlike a C-H bond, a C-F bond isn't vulnerable to attack by F_2. This pervasive perfluorination would contrast with the role of oxygen atoms in Earthly biochemistry, in which oxygen atoms are only present at specific sites.

Development of technology on a fluorine world will be difficult. Although many natural products may be "plastics," free metal will tend to inflame spontaneously. On Earth fluorine can be handled—carefully—in some metal containers, because a thin, resistant layer of fluroide forms and protects the metal underneath. But smiths striving to smelt metal from ore in a fluorine atmosphere will have a hard time accumulating any metal to begin with. The problem will be made worse because oxygen, having been shouldered out of everything else, will undoubtedly be a major component in the fluorine atmosphere. Smelting in an atmosphere of fluorine *and* oxygen will be doubly hazardous.

A cold planet, with oceans of liquid HF and air yellow with free fluorine—is there any way we can gather together enough fluorine to give this biochemistry a chance? Maybe, if we tweaked the energy levels of nuclei, we could make fluorine somewhat more abundant.

Let's delve back into nuclear physics. I already mentioned that, because of the "odd-even" rule, nearly all nuclei with an odd number of protons *and* an odd number of neutrons are unstable. However, four such nuclei are stable: the four lightest with equal numbers of protons and neutrons (the 1-1, 3-3, 5-5, and 7-7 cases). For these light nuclei, you can mix and match protons and neutrons to achieve the stabilizing pairing energy.

The next "odd-odd" nucleus, with nine protons and nine neutrons, is an isotope of fluorine, ^{18}F. Alas, it is *not* stable; in fact, it ain't even close: Fluorine-18 decays into oxygen-18 with a half life of a little under two hours. As you pile protons into heavier nuclei, electrical repulsion between the like positive charges on the protons builds up to the point where protons and neutrons are no longer effectively equivalent. ^{18}F is a smidgen too proton-rich to be stable.

If we could tweak the physical constants that determine nuclear binding, fluorine-18 might become stable. Then it might be easier to gather enough together to set up a biochemistry (although there's still an *awful* lot of oxygen-16 around). Maybe, for example, in some

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other universe the ratio of the electrostatic force to the nuclear strong force is slightly less, so that you could have a higher ratio of protons to neutrons before a nucleus becomes radioactive. However, if the constants were such that fluorine-18 were stable, there would also be lots of effects of other nuclei, and these effects might make life impossible for another reason. Carbon might become a rare element, for example. (Hey, you nucular phys'cists out there! What would happen?)

So much for breathing fluorine. Chemically it might work, although its reactivity will stunt the growth of technology. The scarcity of fluorine, however, is an overwhelming obstacle.

Let's now look at chlorine; it presents a different set of problems. Like fluorine (and the rest of the halogens, for that matter), it is an odd-numbered element, having 17 protons and two stable isotopes; ^{35}Cl (75%) and ^{37}Cl (25%). However, chlorine is more common than fluorine; for every atom of fluorine there are two atoms of chlorine. Further, although chlorine is strongly electronegative, it is less so than oxygen. At least it doesn't try to displace oxygen from oxides, so we don't have to worry about sweeping away a huge oxygen excess.

In fact, the chemistry of chlorine is quite different from that of fluorine; unlike fluorine, for which a reasonable biochemistry can be postulated (at least until we consider elemental abundances), chlorine as a direct analog of oxygen just doesn't look possible. First, although hydrogen chloride, HCl, is a highly stable, exothermic molecule like H_2O and HF, HCl is only slightly hydrogen bonded. Thus its boiling point is extremely low (-84.9°C) and it has a small liquid range (it freezes at −114.8°C). Not only would oceans of liquid HCl be very cold, they would be highly vulnerable to climatic fluctuations. HCl is just not a good analog for water.

There's more. HCl also reacts strongly with liquid water; in water solution, the molecule completely splits into ions, electrically charged atoms: a positive hydrogen ion, H^+, and a negative chloride ion, Cl^-. Hydrogen ions are what make acids acidic; this aqueous solution of hydrogen chloride is hydrochloric acid. Dissolving gaseous HCl in water yields about 18 kilocalories, about as much as you get by forming HCl from hydrogen and chlorine in the first place! The chloride ion and water get along just fine. (In fact, most inorganic chlorides also dissolve to yield Cl^-.) Chloride stability has profound implications for chlorine breathers because (you guessed it) water is so blamed abundant. If we were to insist on using liquid HCl as a water analog, we would have to dispose of all water in the vicinity. That's a different problem from disposing of all oxygen, but it is no more reasonable.

Finally, the most telling blow against the "analogous" chlorine biochemistry is that you just don't get much energy from it. The HCl reaction releases respectable energy, as I've already mentioned; but on an atom-for-atom basis it releases only one-third as much energy as the reaction of hydrogen with oxygen to form water. And the reaction

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to form carbon tetrachloride (CCl_4; analogous to CO_2 for oxygen breathers) is much worse; per atom, you get about twelve times as much energy by reacting the carbon with oxygen! CCl_4 is also a much less stable molecule than CO_2 or CF_4; solar ultraviolet radiation will break it up handily. Our photosynthetic cycle is nipped in the bud.

Is chlorine then hopeless as a breathing gas? Well, maybe not; photosynthesis and respiration are simply convenient ways of storing and releasing chemical energy. Let's try a different tack.

Virtually all the Earth's chlorine, some 3.1×10^{19} kg, is chloride in the oceans. Further, most of the chlorine that isn't now in the oceans once was; it has been sequestered by geologic processes (either trapped in sediments or as salt deposits). Given the stability of chloride in aqueous solution, this fondness of chlorine for Earth's oceans is not surprising.

Now the oceans, of course, are where terrestrial life originated, because of water's unique role as the solvent for biochemical reactions. And there's lots of chloride in seawater. In Earthly biochemistry the chloride doesn't get directly involved in biochemical reactions as a rule. However, forming chloride from free chlorine releases about 80 kilocalories per mole, a respectable amount. What about respiration based upon converting free chlorine to chloride? Maybe; let's see.

The first step toward evolving such a biochemistry would be to develop a mechanism that converts chloride into organic chlorine; that is, for removing the electron from the Cl^- ion and attaching the chlorine atom directly to a carbon atom. Toxicity could motivate evolving such a mechanism; such critters would make themselves unappetizing by incorporating organic chlorine into their molecules. (Imagine! Natural DDT, Lindane, Chlordane, PCBs, and so on!) As on Earth, such compounds would be toxic because they would be new. The introduction of such compounds into the environment should clear out a lot of ecologic niches.

Once a chloride-reducing mechanism was in place, it would then be a relatively simple step for a photosynthetic organism to start manufacturing free chlorine. As with oxygen-releasing photosynthesis on Earth, if you can learn to use the highly corrosive gas released, you get big dividends in energy.

What happens to chlorine in an atmosphere? Chlorine reacts with liquid water:

$$Cl_2 + H_2O = H^+ + Cl^- + HClO.$$

Waitaminnit. Didn't I assert a couple of pages back that chlorine is less electronegative than oxygen, so that it won't replace oxygen in oxides? I did—but here we're not dealing with chlorine replacing oxygen directly, we're dealing with chlorine becoming *chloride*. And *this* reaction is favorable enough that chlorine will try to replace the oxygen in water to form chloride. (How curious! The chloride ion only exists at all in a water solution; you have to have lots of extra water around for this reaction to make sense.) In fact, we could have guessed that chloride cannot be oxidized by O_2 to yield energy; if this were possible, some enterprising critter would

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have learned how to do so in Earth's oceans, and we'd have free chlorine in the atmosphere. That doesn't happen.

Now let's look at this reaction in detail. First, for every chlorine molecule that reacts a hydrogen ion is formed. Oceans under a chlorine welkin are going to be very acidic, and I'll return to the implications of that in a minute. Second, one of those chlorines gets transformed immediately into a chloride. That's awkward; it short-circuits biologic respiration, like oxygen consumed in fire rather than in breathing.

Additionally, hypochlorous acid, HClO, is a good oxidizing agent. (HClO dissociates slightly to H^+ and ClO^-, the hypochlorite ion; this release of a little H^+ makes it an "acid.") Chlorine and oxygen are not happy in combination, and they part company as soon as possible. The chlorine reverts to stable chloride, and the oxygen attaches itself to a more congenial molecule. Like an organic molecule: in commercial water chlorination, hypochlorous acid from the reaction of chlorine and water oxidizes organic matter and kills microbes. Hypochlorite is also the active ingredient in "chlorine" bleach; Clorox and its clones are dilute solutions of sodium hypochlorite. The bleaching occurs when the hypochlorite oxidizes dyes to simpler (and colorless) molecules. (I've always found it amusing that the bleaching action of "harsh chlorine bleach" stems from its oxygen, not its chlorine; thank you, Madison Avenue!) In a chlorine-breathing world, no doubt some critter would learn to use hypochlorite to oxidize food.

Finally, if left to itself hypochlorite ions can even release free oxygen:

$$2\ ClO = 2\ Cl + O_2.$$

Thus, in time chlorine gas over water reacts to form hydrochloric acid solution and free oxygen. The reaction is very slow at room temperatures. But the entire process bypasses chlorine respiration, and tends to form an oxygen atmosphere instead. As with fluorine, we perhaps can slow the reaction down somewhat by assuming a cold planet. Still, it may be difficult to build the concentration of chlorine to the point where there's enough to breathe.

Now let's go back and look at the acidity. As you might guess, acid—free hydrogen ions—is good at weathering rocks. Acid reacts most spectacularly with carbonates. I mentioned earlier that most of the Earth's carbon is tied up in carbonates, which are principally limestone ($CaCO_3$) and dolomite ($CaMg(CO_3)_2$). These rocks are slightly soluble in water; that's the source of limestone canverns and sinkholes in humid regions. And when they dissolve, they release carbonate ion:

$$CaCO_3 = Ca^{++} + CO_3^{=}.$$

Now, the carbonate ion, CO_3, reacts enthusiastically with hydrogen ions:

$$2\ H^+ + CO_3 = H_2O + CO_2^{=}$$

and the CO_2 bubbles away into the air. Every geology student learns this reaction; it's the test for limestone: see if the sample fizzes with a few drops of dilute acid.

Water in an atmosphere containing one hundredth of an atmosphere of chlorine—only one twentieth the amount of O_2 in our atmosphere—would have a pH of about 3.5—about like vinegar. (Talk about acid rain!) For calcium car-

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bonate to be stable under such acidic conditions, the pressure of CO_2 over the solution must be a few tens to perhaps several hundred atmospheres (based on my back-of-the-envelope calculation.) For comparison, Earth and Venus each possess only about 100 atmospheres of CO_2. Thus most carbonate will dissolve and the CO_2 bubble back into the air.

Uh-oh. And after I said that we are going to need a cold planet; how do we prevent a runaway greenhouse, like the one on Venus? Well, it will take a long time for a gas as reactive as chlorine to accumulate in the atmosphere, and during the slow buildup the carbonate may be gradually replaced by other carbon compounds. It took a long time for O_2 to accumulate in the Earth's atmosphere, as well; all of the readily oxidized material had to be consumed first. In fact, far more oxygen has been freed by photosynthesis over geologic time than is currently in the atmosphere.

CO_2 causes another problem for the chlorinated biochemistry: carbon dioxide and carbonate are the major reservoirs for carbon, the basic biological building block. We will need a mechanism for separating carbon from oxygen, and then disposing of the oxygen. The problem will not be as severe once the chlorine-breathing biochemistry has evolved for a few billion years, because by then most carbon must be cycled into a form other than CO_2. However, the carbon carried down by the subduction of crustal plates will reappear as CO_2 in volcanic gases. We're still going to need an ongoing CO_2 removal service. Such basic carbon-metabolizers may be equivalent to lowly but vital denizens of terrestrial ecology like the nitrogen-fixing bacteria on Earth. They also take a hard-to-deal-with form of an element and render it into a form everyone else can use.

What about the excess oxygen left over when the CO_2 is split? We can bury it by oxidation of crustal rocks, as Earth's excess oxygen has been consumed. (In fact, some microbes might make their living by inorganic oxidation with oxygen, a chemosynthetic lifestyle that would no doubt strike chlorine-breathing biochemists as bizarre.)

As I mentioned, the original incentive for terrestrial photosynthesis was to assure a hydrogen supply. A chlorine/chloride biochemistry will also need a continuing source of hydrogen, and the reaction of Cl_2 with water to yield hydrogen ions could provide such an alternative source. Maybe "acid-fixing" microbes will also be important in the econoloy.

An icy planet, with seas laced with acid for antifreeze, and an atmosphere containing Cl_2, CO_2, and perhaps some nitrogen—maybe it exists somewhere.

No matter what we did, oxygen in one form or another crept into the aqueous chlorine/chloride biochemistry. It looks as though such a biochemistry must involve much oxidation by oxygen, but with chlorine as a molecular "carrier," as in hypochlorite. We just can't get away from the prevalence of oxygen in the crust of a terrestrial-type planet.

But these considerations lead to another possible biochemistry, a hybrid

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oxygen-chlorine one. Suppose somewhere evolution, as on Earth, reached the point of oxygen-releasing photosynthesis by microbes. Then some clever critter learns how to use chloride, more or less as I've already described. The toxic, chlorine-bearing metabolites and secretions would clear out lots of ecologic niches for chlorine-metabolizers. Some bugs may even find it advantageous to release free chlorine. (Gas attack!)

As this sort of biochemistry evolves, what kind of world will result? First, I don't think Cl_2 will accumulate to any great extent in the atmosphere. There's no real incentive to crank it out in large quantities; oxygen's a better energy source. On such a planet, a human could breathe with a respirator to filter out the chlorine—or would die very slowly without one. Acidic oceans and CO_2 release will also be less of a problem, particularly since ordinary oxygen-releasing photosynthesis will consume CO_2. All in all, such a planet might be relatively Earthlike (but don't drink the water and don't breathe the air!).

There's one possible catch, which unfortunately is major: there will be no ozone layer. Ozone is an unstable form of oxygen with three atoms to a molecule: O_3. Ozone is highly toxic, but is nonetheless very important to Earthly life. A thin layer of ozone high in the stratosphere absorbs high-energy solar ultraviolet radiation that would otherwise irradiate—and sterilize—the Earth. Chlorine (and other halogens) catalyze the conversion of ozone molecules back into ordinary oxygen. Chlorine in the atmosphere of an otherwise Earthlike

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planet will prevent an ozone layer from forming. The Earth's layer formed when oxygen started to accumulate in the atmosphere, and once formed, the screening of high-energy UV allowed the Earth's surface to be colonized by life. Unless a substitute absorber occurs on a "chloroxygen" world, further evolution will be stymied.

To atone for my destruction, or at least circumscription, of numerous story plots in this article, I'll sketch out some implications of a chloroxygen world. (I'll assume the UV screening problem is solved somehow.)

Consider, for example, the effects on the evolution of a technological society. The corrosion potential of a chlorine-oxygen-water environment is awesome, almost as bad as fluorine. More than ten years ago I started on the musings that led to this article during a stint as the maintenance man for a municipal swimming pool. Such a large commercial pool is chlorinated with gaseous Cl_2 injected as the water is pumped through the filtration system. And the mixture of water, oxygen, chlorine, and sunlight is hell on machinery. This is no way to treat steel plumbing or fittings! Further, to keep the acidity at bay you must continually dump soda ash (Na_2CO_3) by the kilogram into the pool. If the pool becomes too acidic, the plaster that lines it starts to etch. And all of this comes from one little cylinder of Cl_2 gas that is changed every week or so!

Any intelligent inhabitants of a chloroxygen world will have great difficulty in creating a metal-based technology. Maybe they'll go directly to plastics; wood may already be the equivalent of PVC.

Here's another idea. Suppose we were to introduce a simple, chloride-fixing microbe from a chloroxygen world to a planet like the Earth. Remember, the chloroxygen world started out like Earth, but took a slightly different biochemical path by employing organic chlorine and Cl_2.

Chlorinated organic molecules, highly toxic to and very slowly degraded by Earthly life, will be natural and ubiquitous components of the chloroxygen biochemistry. So our chloride-fixing beastie, if simple enough, may find Earth's environment bland but not hostile. In fact, it may be a paradise; there's water, oxygen, organic matter —and an awful of chloride that nobody wants just lying around.

The rabbits in Australia were subject to more natural population checks. And as the beasties multiply, they start dumping metric tons of chlorinated metabolites into the biosphere . . . Uh-oh. Infection of an entire planetary ecology?

This sort of biochemical contamination seems less likely from a chlorine-breathing world, because the microbes there won't be equipped to deal with free oxygen. But there are many anoxic environments on the Earth. Maybe we'd better be careful in this case, too.

Stories, anyone? ■

● The eye sees only what the mind is prepared to comprehend. Robertson Davies

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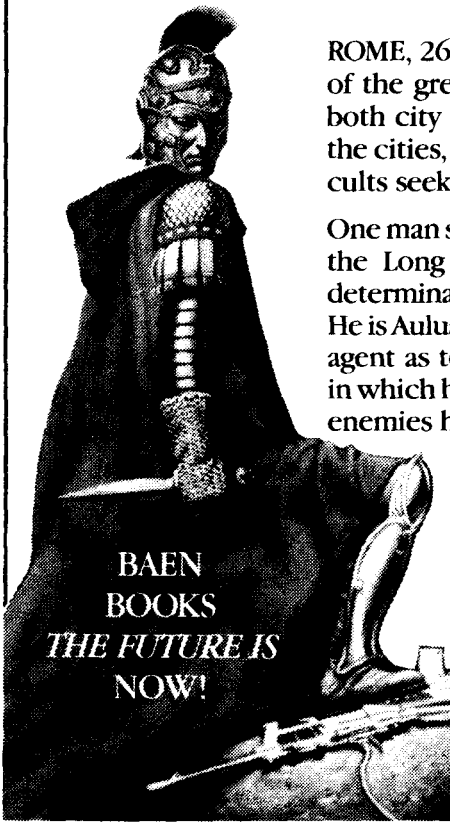
Roman Courage Versus Alien Ferocity
in a Battle
of the Ages

Birds of Prey

By David Drake

BY THE AUTHOR OF
HAMMER'S SLAMMERS AND
DRAGONLORD



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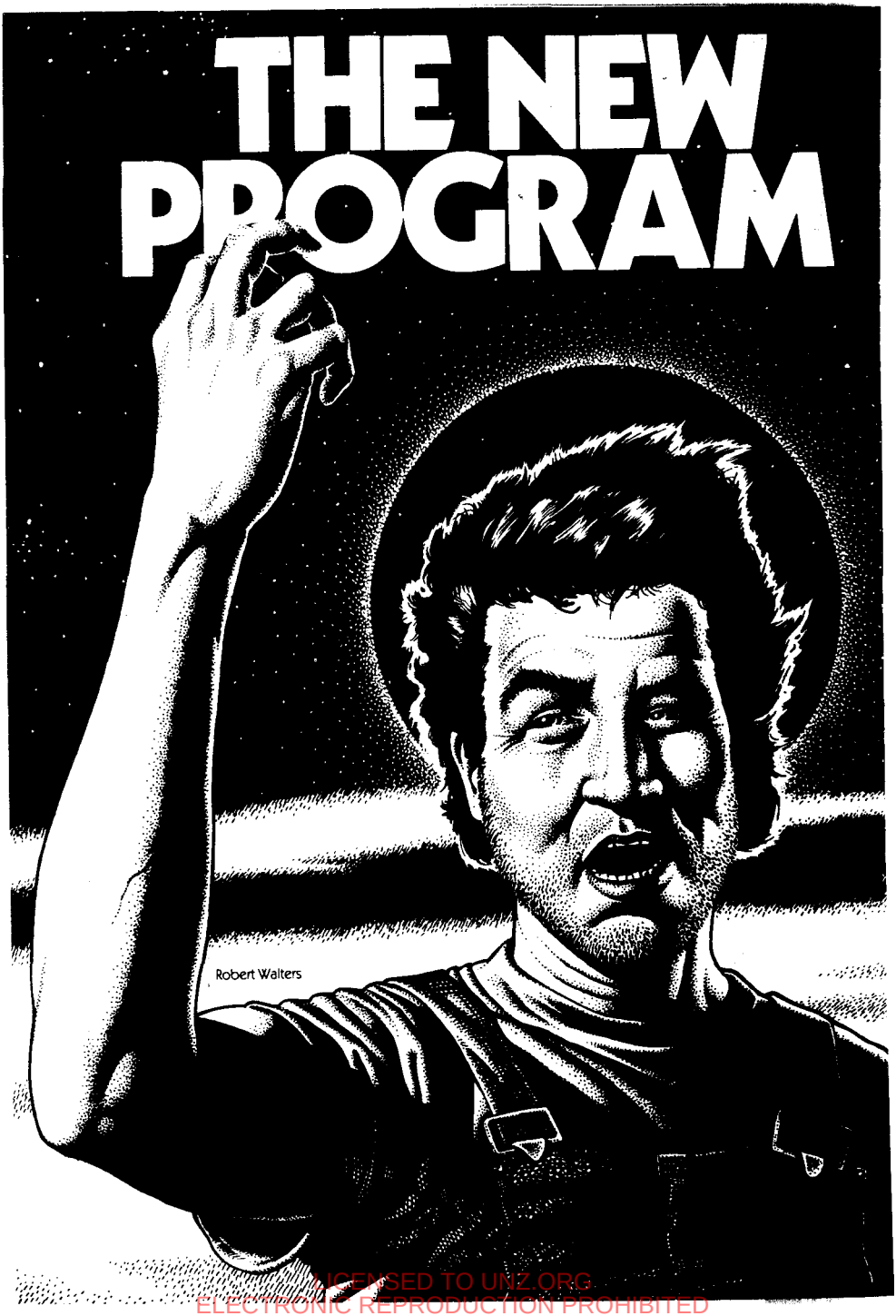

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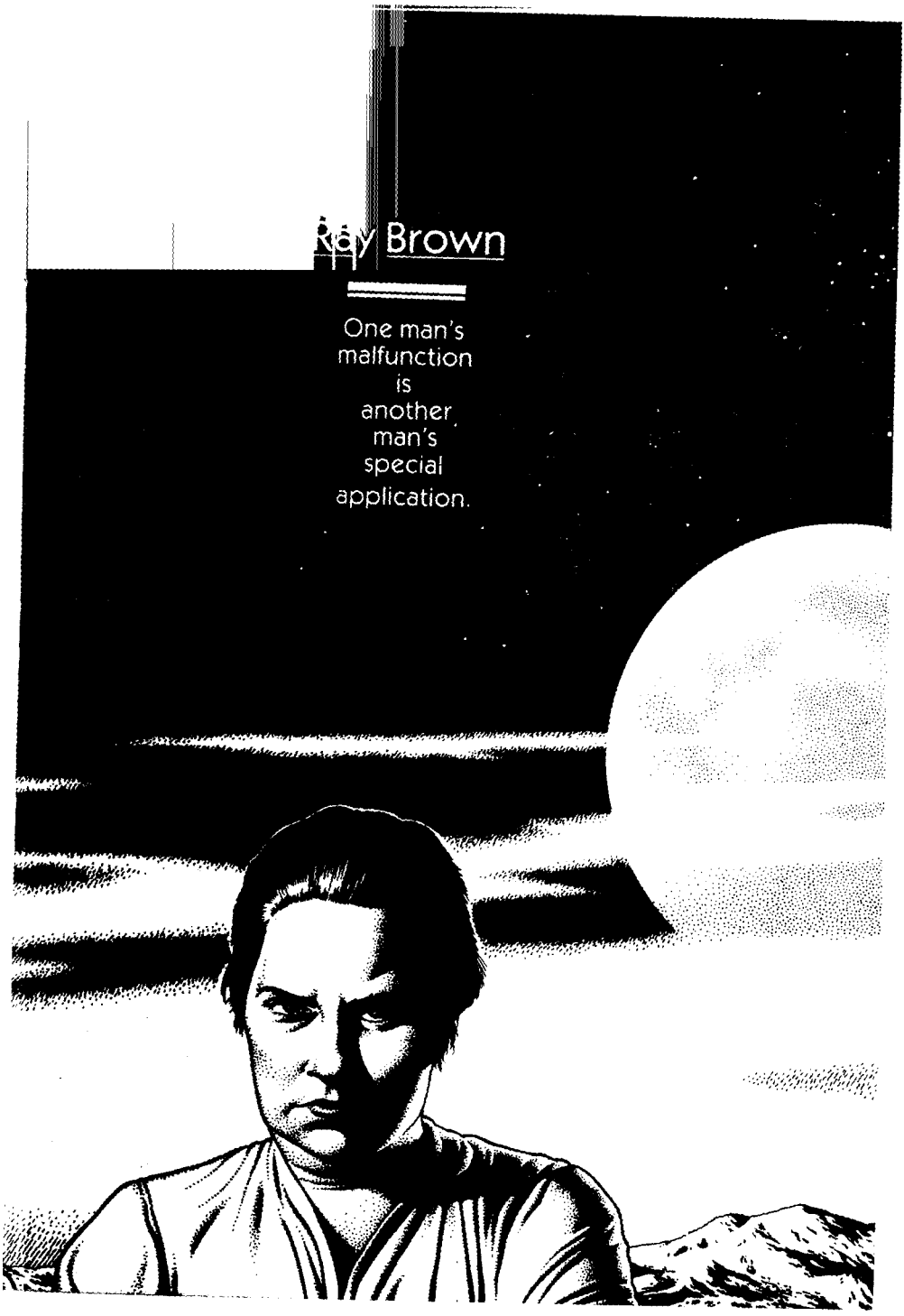

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Hooten walked through the busted front gate as if there were no gate there at all, slamming it with his right leg and bouncing it off his left. It hit hard, but he felt no pain—he'd been lost in thought too deep for pain from the minute he'd caught sight of his wife. The look of her, as always, moved him strongly, but the way she moved him had changed over the past year.

He was trying to come up with a good reason for sticking with her.

He'd been trying for months with no success; yet he stuck. He'd married her because she wouldn't let him have sex with her otherwise—but that was no reason for being with her now. It was old stuff, as exciting as a steady diet of frog legs.

She looked sort of like a frog, now that he thought about it. When she was angry, which was usually, the skin under her chin puffed out with her bellows. When she wasn't it just hung there. Hooten wasn't sure which looked worse.

He felt his face redden. His fidelity was a source of deep embarrassment to him—something his friends in town never brought up unless they were trying to annoy him.

She was slopping the hogs—throwing mash in the trough as if she were trying to knock it over—and a lot of it splashed back on her bare feet. Whenever that happened her throat would puff up a little more and she'd throw harder. When she finally noticed Hooten walking up the hard, dry ruts of the front field to their rented shack it puffed all the way up.

"You knocked me up, Hooten," she said accusingly. "I ast the doc."

"I figgered I might've," Hooten mumbled. *No doubt about it,* he thought. *It's long past time to hit the road.*

"You figger on getting a job, too?" she asked. "We ain't hardly got enough to keep these hogs fed, let alone a child."

"The Lord'll provide," Hooten said, shrugging.

"Don't you blaspheme at me! The Lord sent thisere child so you'd have to do something else with your sorry life besides gambling and getting drunk and getting *things* put in your head."

Hooten sighed. She might be right. She was on a lot more intimate terms with the Lord than he was.

"You hear me? I'm talking about them *things!*"

She sure was down on sin. Worse than the Lord, maybe. She didn't drink or chew or get made up or wear anything besides the government-freebie blue tunic. And *things* was the worst sin of all—modular personalities, the brains called them. Hookups to different programs in the computer at PsychTech, Inc.

He'd driven her past the PsychTech building once, back when the car worked, to show her that people, not demons, came out—but she wouldn't even look at it. She'd covered her eyes with her hands.

Sometimes Hooten wondered why *she* stuck with *him*. Was it just to reform him? Maybe not. Maybe she had a more human reason.

"Hell, old lady, you like them psyops yourself, only you're too scared of the devil to own to it."

The puffing under the chin subsided, and it was worse. Everything but the jowls turned to stone. Then a sly look

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came into her eyes and she said, "You don't seem to be anything in particular today. What's the matter?"

Hooten had missed his third payment in a row—lost it in a crap game. PsychTech had turned him off. But he was damned if he'd admit it to her.

"Thisere's a new one I got," he said, walking on past her and up the swaying wooden steps to the porch. "They call it, uh . . . Bluebeard Mark III and it's . . ."

"Don't tell me nothing about it. I don't want to hear."

"Then shut up yourself."

She shut up and went back to the hogs.

Hooten went on in the door to the kitchen and siphoned warm homebrew into a glass for himself, right out of the vat. One of the talents of which he was particularly proud was being able to drink new beer without getting very sick.

He belched, sat at the kitchen table, and thought about jobs.

Seemed like it was always food, one way or another. His grandfather'd come to this planet to farm, and though he hadn't been any good at it, he'd stuck. His father'd been worse and stuck. Hooten was the first of the line with the sense to try a job—but it was still food. He'd worked the frog farm, and the Wilson Hot Pepper Sauce plant ("Shipped Daily Fresh From Hell") and the plant where they'd packed the legs from the frogs. The best job he ever got was running errands for PsychTech. And there, what he usually ran for was food.

Hooten was damned if he'd sweat another dram to help feed anyone but himself.

Still . . . he could work off his debt, if he could get PsychTech to take him back. And he could get new psyops at a discount.

The old lady came in, slamming the swill-bucket into the sink and glaring at him in a way that burned his soul, and he saw again that the whole idea of a job was foolish. The thing to do was to ditch her and get back out on the road, on the bum.

Hell, it'd been PsychTech got him involved with her in the first place.

He'd been working the seven-to-fourteen shift and Cal Mays, the Evening Supervisor, had come to him with a problem.

"I need a good, strong body," Cal said, with his excuse-anything wink. "There's a lady with an old man down the road, but she won't bring him in, and he's drunk as a skunk. It's on a government contract. A loony."

"Let him come in his self," Hooten said.

"If he could do that," Cal said, "I wouldn't be asking you to help. Oh—and pick us up some roast pork sandwiches while you're at it. They're parked next to the deli."

So Hooten walked a good quarter-mile down the road to where the old car was parked. On the way, he tuned in to his newest psyop.

When he got to the car, the old man was gone. There was only this ugly, somehow fascinating woman resting her head on the steering wheel, chewing her lip.

"Hi, beautiful," he said. "Where's your poppa?"

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"I ain't beautiful," she said. "And Daddy's drunk. Crazy drunk. He gone to that infernal place his self. My daddy's a man of God, but no man could stay straight with what he's gone through."

Hooten and his program both felt better. It'd be hard to herd a cantankerous oldster to PsychTech and keep the sandwiches unsquished at the same time.

"I hope you're not talking about PsychTech with that 'infernal place' business, beautiful," Hooten lied. "That definitely shows a backward attitude."

"Why you keep calling me beautiful?" she asked. "What's the matter with you?"

"It's what they call a modular personality, baby. A Cool 28. A modified Bogart with a Disillusioned Professor base. And there's nothing wrong with me that you couldn't fix."

The girl's eyes widened, whipped him. "You got them *things* in your head," she accused.

"Just one *thing*. You get different attitudes by changing what PsychTech's computer does to the thing."

"It don't matter how you get them in you. It's vanity, is all. God give you your very own head, you don't need other ones."

Hooten had noticed the girl perk up every time he called her beautiful, and he didn't buy any of what she said. He'd never met a woman in his life who didn't like the Cool Series.

"You're missing the point, beautiful," Hooten said. "The point is it feels good. What if those other heads are in a better mood than yours—which seems very likely in your case? Besides, it's fun. Don't you have any fun in you?"

"Not much," the girl said. "But what I got is *my* fun, at least."

She started up the car with a roar and took off, leaving Hooten slackjawed.

It was only a week later that Cal took Hooten aside at work, at about the same time in the evening, and said, "Look, Hooten, I need someone understanding and patient to guide that man you didn't bring in last week home."

"Got the gennulmun aw fixed up, have yuh, Baws?" Hooten asked in a raspy voice. He was switched into the company-recommended Happy Darkie mode.

"That's right, Rastus," Cal said, winking. He opened the door of his office and guided the old man out.

The old man looked just like what Hooten figured the father of such a daughter would be. He had a long white beard, a straight, unforgiving mouth, and deepset, fierce eyes. His voice, though, was strangely gentle.

"I'm a changed man," he said, as though stating something that needed to be pointed out, but which wasn't intrinsically interesting.

"You take him on back to his place," Cal said, fishing in his pocket. "Here's some money. Take a cab. He's old and weak, so help him in and out. He'll be able to tell you how to get there, I think. Don't hurry. Oh—and pick us up some coffee on the way back."

"Yowsuh, baws. I taken him."

"What's the matter with you?" the old man asked Hooten.

Hooten switched out of the Happy Darkie and grumbled, "You just the same as your daughter, old man." He guided him down the hall toward the door.

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"You met my daughter?" the old man asked.

"At the car. I was supposed to pick you up, but you took off ahead of me."

"Well, what had to be done had to be done—no point in waiting. Besides, I was drunk." His eyes narrowed and he added, "You like her?"

Hooten shrugged.

"Well," the old man said glumly, "I didn't reckon you would."

But when Hooten got the old man to the big old house in the hills where they lived, and the ugly girl came running out to meet them, he felt his heart speeding up. Common sense told him that if he had anything to do with her, she'd devote her time to spoiling his fun—but then again, it was fun in itself to feel the juice pumping into him when he watched her.

She ran to the old man, though; not him. So he tuned in his Cool 28.

"What they done to you, Daddy?" she asked.

"I'm a changed man," the old man said.

"Dear sweet Lord! They taken your gift!"

"Right out my blood, girl. But the truth of it is, I ain't felt so good since I was this fella's age. The Lord never minded who He picked—whether a man were suited or not. He just says come and you got to. Could be them psyops men done me a favor."

Hooten wasn't sure what all this stuff meant, but he could see that if it was meant to comfort the girl, it wasn't working. That was the first time he saw her throat puffing out in that astonishing way, and her voice swooped out of it in a piercing bawl.

"You sposed to be a prophet of God! Why would He allow them to take your voice away?"

"T'was *His* voice, girl."

"Shouldn't never have prophesied at the Capitol."

"T'was Him told me to do that, too. And He'd know what would come of it. I reckon that was the last use He had for my voice."

Cool 28 was fascinated and amused by this bizarre conversation, and he said, "You've gotta take it easier, beautiful. You're getting yourself worked up over nothing—even your old man says so. You sure you're not just scared of what life'll be like without the glory of being the daughter of some new Jeremiah?"

"YOU HAVE SOME RESPECK!" the throat yelled.

The old man shook his head. "I'm not sure I like the way he put it, but he might be right all the same."

The throat subsided. The girl lowered her eyes. "I been vain," she said. Chewing her lip, she turned and wandered slump-shouldered back up the dirt path to the house.

Hooten didn't see any more of her that day, but he kept going back there, using one bad excuse after another while he was at work, and going there after work when he was out of excuses. The weirder she got, the more she fascinated him. He kept going back for more, until he found himself in the terrible fix he was in now.

That fix, he resolved, watching her slamming the kitchen drawers to no purpose he could think of, he would get out of one way or another. Maybe he couldn't just up and leave for nothing,

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but she was always doing something good enough to leave for. All he had to do was be himself and she'd Save him. She'd Save him right out to the road.

He belched again and went to the vat to draw off more beer.

"Ain't one enough?" Hooten's wife said, bitterly.

Hooten said nothing. He sucked on the hose to get it going. But just as the bittersweet liquid touched his tongue, he felt the hose being snatched from his mouth. Beer sprayed his face. His eyes burned.

Hooten wiped his face with his hands and suppressed a smile.

"I had enough of your shit, old lady!" he hollered. "I'm gone. You hear me? I'm *gone*."

She dropped the hose and it slithered out of the jug, leaving a little brown pool at her feet and Hooten's. Her eyes and throat swelled with startled rage, but her lips clamped shut and Hooten figured she wasn't planning to let anything out of them soon.

Hooten felt his shoulders shrugging as he turned to walk to the bedroom. He moved fast and his wife didn't follow.

He threw an aluminized steel box from the closet to the bed, where it *spoinged* open, and began stuffing it full of bum things—a cake of laundry soap, Ironweave Jeans, a green hard-rubber flask—at top speed, automatically.

It was a strange box, Hooten thought. Thick, like the steel was doubled over and bent around something.

Then he remembered that it was. The box was insulated. They'd packed Extra Fine frog legs in this box.

Hooten thought associatively about as often as he thought logically—one seemed to work as well as the other for him. So the box decided him to head out east in the direction of the Frog Plant when he bummed, instead of west toward PsychTech.

He strapped the box shut and carried it out into the kitchen. His wife wasn't there any more. He grinned nervously and lit out the back door, making a wide circle west through the pulpy, sweet-smelling trees until he came to a stretch of road out of sight of their patch of land.

He sat on the box and waited for someone to drive frogwards.

He waited a long time.

He was still there when the sun was setting fire to the forest. He cursed out loud—a string of simple, all-purpose oaths passed from father to son for uncountable generations. What little traffic there was, was all moving from west to east.

He was reluctant to change his plans, as if there were deep significance in the choice of directions—but he did change them. He crossed the road and within a minute a truck screeched to a stop beside him.

The driver, a big blond man with a square handsome chin and eyes hidden by sunglasses, leaned through the window and announced, "I'm turning off past Taskala towards the spaceport, but I'll give you a lift that far."

"How you know I ain't fixed for the port?" Hooten asked, scowling and climbing aboard.

The driver looked him over and nodded.

"Come to think of it," he said, "you

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look like you'd probably go any which way. So come as far as you want."

Gears clattered with an eerie looseness, like pots thrown down a well, and the truck began to roll. As they passed Hooten's spread, Hooten searched through the twilight for the figure of his wife. He saw nothing, and that bothered him.

He resisted the urge to jump off by sliding down the seat until he couldn't see through the window any more.

"You tired?" the driver asked.

"Of some things," Hooten said. "Is there any work at the spaceport where they ain't food?"

"Huh?"

Hooten's mind, of itself, was thinking of ways to get money to feed a kid and make up with his wife. What the hell good was a mind, he asked himself, that had a mind of its own?

"Nothing," he growled. "A stupid question."

The driver looked him over again—this time a little nervously.

"This truck's about to fall to pieces," he said in a small-talk voice. "Since those engineers from Earth started building that airwheel system, the bosses've just been letting everything go, waiting for the Big Day. Those Earth brains have been pushing the Big Day back quite a few . . ."

"It don't mean nothing to me," Hooten interrupted grumpily, finding the thought popping into his head from nowhere that maybe he could play craps or poker a little while when he was in town and then head on back to home.

"Piss on you, you crazy hick," the truck driver muttered.

There was silence for a long stretch of road, then the driver seemed to reconsider.

"Reverend Maisonneuve has a mission right outside of the port," he said. "I could drop you off there."

"No thanks."

"Sometimes I go listen to him preach. He says he'll take in anyone, no matter what they're like, because . . ."

"Ain't looking for no flop, neither."

"I didn't say you were. But the thing is, it's interesting. He says all God cares about is if you're saved, and what that means . . ."

"I reckon I'm a good man already."

The driver hissed with exasperation and his voice took on a harder edge. "I doesn't matter if you're good," he said. "Being good or bad—what they call works—that don't mean shit. God doesn't care if you're good or bad near as much as He cares if you're right with God, which isn't the same thing. Reverend Maisonneuve'd put the lowest life there is up for the night. On the other hand, if you never show, that's no skin off his ass either."

Hooten knew he was being insulted, but was sunk too deep in his own troubles to answer. They drove on in silence.

When they got to town and drove past PsychTech Hooten found himself thinking more job thoughts. He pushed them out of his head with difficulty—the job was so hard, in fact, that he found himself panting as they stopped at one of Taskala's three traffic signals, only a block down the street.

When they started up again the usual clattering became a horrible grinding accompanied by a *ping;* the truck lurched forward as if launched from a slingshot

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and slowed to a stop. Clattering could be heard again now, but this time it came from somewhere abaft the truck.

The driver beat his head softly against the steering wheel, sighed, and looked up. "It had to happen some day," he said. "I got to call this in. You're going to have to find yourself another ride, fella."

Hooten nodded slowly and climbed out. He leaned against the back of the truck and watched the driver kick the warped metal disgustedly and walk off toward the corner.

Hooten stayed where he was until the driver disappeared, then ran to the front of the truck and flipped the switch that opened the van doors. He knew two things about goods that were being shipped through space—one was that they were always very valuable and the other was that, unfortunately, sometimes they were only valuable someplace else. Like extra-fine frog legs, for instance. He kept his fingers crossed and hopped into the van and discovered a crate of blue Wuthr pelts, worth a bundle even here, on their native planet.

Ed's Bar (after Ed died) had spent a lot of money importing expensive, garish neon signs by spaceship, just to reinforce the atmosphere. It was that kind of place. Here Hooten had spent some of the most pleasurable hours of his life, losing at poker, losing at craps, losing at acey-deucy, losing at backgammon . . . and occasionally winning. But it was the company that gave him pleasure, more than the gambling. Even when he won he had a good time.

By the time he'd changed the pelts into money, PsychTech's Accounts Outstanding department had been closed to customers, so he had to walk into Ed's without being tuned in. That made him itchy. He'd have to fake it and the only psyop he was sure he could fake was the Happy Darkie, which wasn't exactly appropriate.

He bought an expensive whiskey at the bar, then spotted three of his friends through the smoke. They were at the table by the john door, playing cards of some kind with a gangly stranger in outlandish, expensive-looking clothes. He sipped his drink and strolled over, trying to move his legs in the saunter of a Cool 28.

"Hello suckers," he said. "What's the game?"

Bald, fat Art looked up from his cards. "Stud," he said. "Either kind. What's the matter with your voice, Hooten?"

Hooten jerked his head back from Art's cards a little, startled. "Whaddya mean?" he croaked.

"You act like you're hooked up," Art said with a malicious grin, "but you ain't. The voice ain't right—it's too harsh. And you'd never catch one of the Cools sticking his nose in somebody's cards, neither."

"Shit I ain't," Hooten said. "It's a new model—The Cool Hick, they call it, and . . ."

The table erupted in laughter.

"You're a card yourself, Hooten," Art said after a while. "I bet PsychTech turned you off, you lost so much money in the crap game the other night. Sure, that's it . . ."

"Well, I got money now," Hooten grumbled, pulling up a chair. "So deal me in."

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Hooten bluffed on a queen high and got away with it, tried to bluff again on a pair of treys and lost all he'd won and a little more to Bill, a skinny, red-eyed farmer who really *was* plugged into Cool 28 and who aroused Hooten's envy.

"Thanks, buddy," Bill drawled.

Hooten found himself stuffing half his money into a back pocket so he'd remember not to lose it all. He began inventing stories to tell his wife when he got back home. He didn't know why he wasn't going on the bum after all, he just knew he wasn't. It was humiliating.

The deal passed to Art, who liked to talk when he dealt. "How's that young beauty you married, Hooten?" he asked.

Art had introduced Hooten to Taskala's two main fences, and Hooten always tried to be nice to him, but now something cracked. He grabbed Art's arm and squeezed until he could feel the bones starting to give beneath the suet. Art's face turned white.

"I don't mind you funning at me, Art," he said. "But I'm tired of people funning at my old lady."

He let go.

"Hell, Hooten," Art said, staring at his arm but not rubbing it, "I didn't mean anything. I just wondered about them psyopping her father—if it still bothered her so much."

Art whipped a card off the top of the deck and grabbed it in midair, all without flinching. "Whoops! Where was I?"

"Misdeal," the stranger said.

"Shit," Art said. "I think you're right."

"What's this about psyops?" the stranger asked with an accent that seemed to originate somewhere Earthward. "You got a war going on here?"

"Nah," Bill said. "Art means modular personalities—'psyops' is what they call them around here. But he's got that wrong. They took Hooten's father-in-law to PsychTech, all right. But they changed him for good—fixed him so he wouldn't spout any more prophecy. Prophecy doesn't sit well with the big boys on this planet."

"Prophecy, huh?" the stranger said. "You still have that here?"

"Whaddya mean?" Art asked, watching Hooten carefully. "Hooten's father-in-law was just a nut. They really did fix him."

"It's a special kind of nut," the stranger corrected. "It's carried in the blood—and I mean that both ways. It's a chemical imbalance—specific, though hard to detect. And it's genetic. Tends to crop up in a family line. People talk to God because their bodies are manufacturing chemicals similar to the ones that cause schizophrenia. And it's being wiped out the same way schizophrenia was."

"You saying they didn't put nothing in his head?" Hooten asked.

"That's right. They ran his blood through a . . . well, call it a filter. And then gave him some shots. It's easy to fix once you've got the equipment, and I guess your local PsychTech office finally got the equipment."

Hooten felt a little dizzy, as if he had seen a sailboat gliding through the rocky old turned rows around his house.

"I thought they put something *in* him to stop," he muttered. "I didn't know they was anything to *take* out."

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"Blood," the stranger said agreeably, nodding. "Out and back, minus the crazies."

Wilmer, the tinker, hadn't said a thing up till then. Mostly he'd been watching Hooten and the stranger closely. Either he was very interested in them or he was afraid they'd cheat; Hooten wasn't sure which. But at last he leaned back and said, "What about the people who don't think it's crazy? I mean the regular folks, who like to listen to these prophets."

"I guess they have to lump it," the stranger said, shrugging. "Though, come to think of it, the more civilized planets haven't been wiping out prophecy *per se*. They've just been making it a matter of choice instead of chance."

"Sounds like a slogan," Bill said.

"It was. But what I mean is—there's always PsychTech. If anyone really *wants* to be a prophet, I'm sure PsychTech could fix them right up."

"Maybe it's God's will," said Wilmer with uncharacteristic piety. "If prophecy gets passed on through the blood—well, that ain't really a fair way of choosing, is it? This way He gets volunteers."

"If God's will is responsible," Bill said, "I'm not sure there *is* such a thing as a volunteer."

"Sure there is," the stranger said, a smile twitching his lips. "You wouldn't deny free will, would you?"

"I can see you got a queen showing," Art said sourly. "If you look at your hole card you can play."

The stranger started. "My bet?" he asked. "Hm. Maybe I'll play without looking."

Hooten looked. He had a black nine on top and a red four under and he folded, scooting his chair backwards.

"Where you going, Hooten?" Art asked. "You just got started."

"I don't know," Hooten said. "I got to think."

Hooten had to knock on PsychTech's door for quite a while before there was an answer. The outside lights were off and the darkness seemed to soak up his thumps. But at last, and all at once, the door was open.

The light dazzled him, and he could make out nothing but a man-shape in the doorway, but he heard Cal's smart-aleck voice saying, "I bet you thought the door was stuck. Well, it's not. We're closed. You got three hours and . . . Hooten!"

The shape stepped back and Hooten stepped in. His eyes adjusted to the light and he saw that Cal was still smirking.

"I got business," he said.

"And you figure, as an old employee, you get special privileges, right?"

"I need you to fix me up, Cal."

Cal's smirk grew to a full-fledged smile. "We got a problem, Hooten," he said. "You're behind in the rent."

"I got the money to pay that off. I always pay up, you know that."

"Yeah," Cal said, nodding. "I guess when it comes to psyops you always do. But I'm not in Accounts Outstanding."

"Come on, Cal. You can write me out a slip."

Cal shrugged and turned his back to Hooten, walking toward the door to his office. "Come with me, then," he said.

Hooten followed him to a banged-up wooden desk from which Cal produced a receipt book. When he had paid and

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got his slip, Cal waved him back a few feet and took a seat on the desk, looking him up and down.

"I wonder how you got so much money all of a sudden?" he asked.

Hooten frowned and said nothing.

"Well," Cal said, "I suppose it's not my place to ask such questions of customers. What did you want this time? The Wandering Scholar? Cool 15? That's still very popular . . ."

"I want to prophesy."

"Beg pardon?"

"You heard me."

"It's hard to believe my ears. Where'd you get such an idea? And what makes you think we'd have a psyop to fit?"

"If you don't, you can always make one."

"Creating a new program would cost a lot more money than what you have there," Cal said, nodding at Hooten's remaining pile of cash. "Anyway, if you want to prophesy, go ahead. Nothing's stopping you."

"I want to *be* a prophet," Hooten said. "It ain't the same thing. You know what I'm asking for, you're just being a pain."

Cal laughed out loud. "Sure," he said. "I know. You want to be like your father-in-law used to be, don't you? That's where you got the idea from—your old lady. Right?"

"I could live with her," Hooten mumbled, "if she'd just get off my case sometimes. And it don't seem like I can leave nohow. I tried. I got to do something."

"I see," Cal said, still grinning. "Well, what you want can't be done right with a modular personality, anyway. What you're really asking for is a personality disorder—a chemical imbalance."

"I know it," Hooten said.

Cal's eyebrows shot up. "You do?" he asked. "I just got the literature on it myself last week—I wonder where your wife heard about it . . . no matter. The reports I got say that they've tried it out on a few people in the civilized worlds, and it seems to work OK. And you've got enough money to pay for that."

"For what?"

"For the chemical imbalance PsychTech's going to give you. Sometimes you're obtuse, boy, you know that? Of course, we can't actually give you the disease. We'll have to give you a shot to get you started, and hollow out a bit of bone to store your supply of crazies—enough to last a couple years, but then you'll have to get a refill . . ."

Cal looked thoughtful, leaned back and grabbed a form from the top drawer of his desk, and began to make checkmarks.

"How long's this gonna take?" Hooten asked.

"Not long," said Cal. "We'll have you out of here by noon."

"I got my box, uh, suitcase in a locker . . ."

"You won't need it."

"I guess I should have the thing that brings them psyops in taken out of my head at the same time, if I'm gonna be a man of God," Hooten added sadly, hoping Cal would contradict him.

But Cal just nodded. "You got enough money to pay for that, too," he said.

Hooten went out PsychTech's door almost at noon on the dot, disappointed.

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He felt little changed, and what change there was was not pleasant. He had expected to be somewhat pleasantly woozy; instead his senses were sharpened. He could hear the murmur of men and women in the buildings across the street, the grunts of far-off animals, the rustling of leaves and grit in the wind, but he heard no Voices. His eyes brought new awareness wherever he looked—they picked out the tiniest specks of sand in the stone of PsychTech's walls. His vision was so acute that it was almost painful, but he saw no Visions.

And he had another pain—he was horribly hungry. They had failed to feed him at PsychTech while they were fixing him. Briefly, stupidly, he wondered what to do about it, then felt in his pocket the terrible hard weight of coins. He still had enough to eat in town and bring home some bacon, too.

He walked on until he stood on the spot where he'd met his wife, and looked at the deli. There was a diner next to it, run by the same management—a greasy, dirty little place, but cheap. He tried to walk in, but his new hypersensitivity gave him trouble there, too, and he wavered in the doorway for a long time. The smell of the place made him want to rush out, but hunger kept him there, gagging.

At last the dried-up waitress behind the counter said, "Come in or go out, for chrissake," and he walked unsteadily to the counter and ordered a plate of frog legs.

The few patrons watched him suspiciously. He could hear the nervous jokes they made about him in voices they thought too low to hear. The waitress set his plate of frog legs down with her arm fully extended, then shied away.

Hooten shrugged and took a big bite, then choked and spat. The meat was unbelievably slimy. He was sure he could feel it crawling in his mouth. He took another, much smaller taste.

It burned terribly.

He screamed, pushed himself out of the stool, and tumbled out the door of the diner, bumping into the people on the street until he became a predictable obstruction and they began walking wide of him, staring at him with distaste. He fell to his knees.

THOU EATEST ABOMINATIONS.

"Yes, Lord."

ALL MY CHILDREN ON THIS WORLD DO LIKEWISE.

"I'm sorry, Lord."

SORROW NOT. I SHALL TELL THEE WHAT IS FITTING FOR THEE TO EAT. THOU SHALT CARRY MY WORDS TO THE REST OF MY CHILDREN.

When Hooten strode back through his gate, his wife was slopping the hogs again. He caught her eyes just long enough for her to jerk them back to the animals. She said nothing.

"You gonna pretend I ain't here?" he asked.

She continued to say nothing.

Hooten walked up to the fence and began kicking it in. This wasn't too hard to do. He hadn't built it very well. When he'd kicked about ten feet of it down, he began shooing the pigs out.

He could see his wife's stoniness melting in her amazement at his bizzare behavior. Her throat didn't even puff up. Only her eyes grew wide, and she

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said, "What do you think you're doing, Hooten?"

"I'm driving these beasts into the forest," he said.

"Are you crazy? That's the only money we . . . I mean *I* got coming in!"

"When men eat of this flesh," Hooten explained, "it's a foulness in the mouth of the Lord His Self. I'll tell you later what God wants us to eat."

Her eyes grew even wider. "My daddy's voice!" she cried. "You stole my daddy's voice!"

"It's the Lord's voice," Hooten said, "and they ain't no stealing about it any which way. Used to be the Lord gave it where the blood called for it—but it's a terrible gift, He says. Now He gives it to those as ast. I ast, that's all. You understand?"

She shook her head violently.

"That don't matter. I'll teach you."

He gave a kick at the last pig—a runt—and it ran squealing from the pen.

"You ain't teaching me a thing. You run away, so you can just stay run."

"Say no more about it," said Hooten. "You're the woman God gave me and that settles that. Am I right?"

His wife was watching the hogs take off into the woods, avoiding his gaze. He walked over to her, grabbed her arms, and turned her around to face him squarely. As he stared into her eyes a look of awe came over her ugly face, turning it into something almost comely.

"Am I right?" he asked again.

She nodded, blinking.

"Good. Now we're leaving this place. *Now*, I mean. We're not even taking a suitcase—I left my own in town. We travel light."

"We can't leave," she protested softly. "I got a child coming!"

"God has commanded me to go forth and preach His Word," Hooten said, turning and walking back through the stubby field toward the road. "You are my wife."

After a minute he heard his wife running after him. She grabbed his arm.

"What about the child!" she sailed.

"The Lord'll provide," Hooten said, shrugging, and she tightened her hold on his arm. ■

● There is no environment without an organism at the center of it. There are as many environments as organisms. He who would study his own environment would be well advised to realize this—that his environment is his alone, exactly like the environment of no one else. Further, what his environment is, exactly, can be comprehended only by himself, for his own perceptions will govern the manner in which he reacts with it.

Calvin W. Stillman

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Some kinds of logic
seem all too clear
to some kinds of people. . . .

Joseph H. Delaney

THE NEXT LOGICAL STEP

Doug Chaffee

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Hillary Wolfe sighted through the instrument she held, struggling to keep its crosshairs centered on the object she approached.

Behind her, like an enormous strand of spaghetti, kinked and curled by thermal forces within its individual fibers, stretched a thousand meters of four-millimeter Dacron line. At the other end was home: the shuttle *Grissom*. Hillary's forward motion was slow, measured, six or seven centimeters per second; still far faster than she would have liked. Sooner or later she'd run into trouble; touch the wrong spot on one of these satellites and the show would be over—for good.

This was the reason for the long tether. If one went up, the shuttle might still make it home—without her, of course. Ever since the U.S. had acquired the capability, they had been checking out Soviet military satellites, finding mostly dead, useless ones; but every so often, surprises.

The one Hillary was inspecting now had been in polar orbit for almost three weeks. Launched after her mission had been initiated, it was of a new type, meaning extreme care was the order of the day.

The Russians knew what was happening, of course. They didn't like it, but there wasn't much they could do to stop it. Eventually they would begin adding anti-personnel devices. That was certain.

Hillary hoped that they hadn't reached that stage yet; that for a little while longer her luck would hold.

So far it had, but the mission planners counted heavily on enemy reluctance to harm his own satellites with explosives.

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Theory assumed that they were the only real danger to the mission.

Hillary wasn't so sure. Her mind was full of visions of lethal electrical discharges, corrosive fluids, radioactive sprays, and sharp, suit-piercing traps.

She found herself four or five meters from the target, and fired a burst from her retrojets. Approach velocity dropped to less than a centimeter per second, much slower than usual.

She knew that the shuttle's command computer was fighting hard to maintain the alignment, to prevent any disturbances to her orientation with the target. The longer the mission took, the harder this would be. Nevertheless, she was not about to cut corners by reaching out for some convenient handhold, as she might with friendly birds.

Instead she studied the situation. Up close, she could see printing on the satellite. It was in Russian, which she read with difficulty. The satellite's inside, she expected, was another matter. To see *that* was the mission.

A short final burst halted her movement relative to the satellite and for a while she simply hung there, scanning its surface.

It was big: a couple of tons. *Typical*, she thought. Russians had a certain fondness for big, clunky things.

Its solar array was massive, appearing capable of generating quite respectable power. Hillary prayed that her thick, rubber gloves would safely handle anything hot which she might touch.

When finally she decided she could learn nothing more from passive observation, she reached back into her pack and grasped the two "walking sticks": crude but effective contact tools with wooden handles, made for her in NASA's shops.

She touched the rubber pad of one to the surface of the target and pressed its forward trigger. Through a tube buried in the pad a drop of adhesive passed onto its surface, oozing between pad and metal, outgassing solvent furiously into nearby space.

Hillary tested her anchor, waited seconds while the solvent cloud dissipated, then pulled closer, drawing her body perpendicular to the satellite's long axis.

Choosing her spot with care, she set her other stick, repeating the test procedure. Then she squeezed the rear trigger on the first, sent a fresh spray of softening solvent into the adhesive, and pulled it free. Eventually she worked her way around the satellite's equator, examining all possible openings.

The moment of truth came. She reached out her tongue and depressed the bar inside her helmet. The microwave switch clicked, tripped, and sent her voice to the shuttle: "Send me the camera."

Immediately the bulky camera started down the tether from the Shuttle's cargo bay, riding its motor-driven trolley device like a misshapen spider.

When it arrived, Hillary fitted its universal mount to one of her walking sticks and aimed its lens at the area of interest: an access cover held in place by off-set headed screws. A quarter-turn of each and the plate would come off, revealing whatever was inside to the video camera—perhaps only for the split second it would take for the satellite to destroy itself, the camera, and Hillary.

Hillary fumbled at her belt for the

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long-handled insulated screwdriver. Hoping for the best, expecting the worst, she turned the first screw.

The reaction was instantaneous: she was jerked around by the strap on her wrist. A vapor cloud rose around her. She felt stark terror.

Anxious moments passed. Motionless, sweating, grateful to be still alive, Hillary reasoned it out and realized what had happened. She had disturbed the satellite's orientation. It had corrected. It was not ready to kill her—yet.

Seven more screws turned. The panel fell away. Hillary didn't try to save it. She'd be disabling the inner works anyway. Again she called: "Harvey?"

"Yes, Hillary?"

"I'll want to give you a close scan before I do anything else. Is the picture OK so far?"

"Perfect. We're getting it all on tape. That looks like a new-type snooper."

"It is. We haven't run across any before. I can see optical lenses, plus what I think is infrared, U.V., and maybe a navigational laser relay. I'll know in a minute. Can I go in now?"

"Yes, but carefully, Hillary. We'd hate to lose you."

"Not as much as I would. Here goes."

Inside were some things Hillary recognized, and which she felt were safe to touch. She snapped on her helmet light and looked around.

There was an internal cover about four o'clock, and midway up, closer to the opening, a rack of circuit boards. *This*, she thought, *is where we switch to English.*

A couple of turns with her screwdriver and the inspection cover came off. Inside was the black box. On its surface near one corner was a familiar logo: "Westinghouse."

They don't even copy any more. They simply buy or steal whatever they need.

"Harvey?"

"Yeah."

"Got it. Stand by to tape. If they have any boobytraps, this is where they'll be."

"Ready, Hillary. *Please*—be careful."

"OK. Here goes the cover." Hillary loosened one screw and pried up another until it broke out of its hole. The cover floated away.

"Harvey! Look! Wow!"

Hillary gazed at an array of at least fifty microchips, each held with plastic straps, all connected by tiny silver wires. Surveying the module, she would have felt safe in betting that none of its components had been made in Russia.

"I'm bringing this in, Harvey, including all the circuit boards. Camera's on the way back. Send a cargo pod."

She threw the reverse switch on the camera's drive motor. It raced back along the tether to the shuttle. No sooner was it out of sight than the cargo pod took its place.

Half an hour later the Russian satellite was stripped of everything that even faintly resembled a microchip, and Hillary crept up the tether to the shuttle.

Vice-Admiral Humphrey Hawkins was a familiar sight around the capital and a fairly frequent visitor at the White House. So it hadn't surprised him when the president's private secretary greeted him by name. What had was the sight of two other senior members of the Joint

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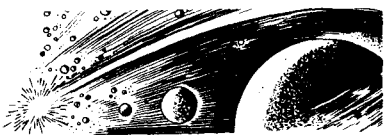

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4/10

Chiefs of Staff: Carroll J. Jones, of USAF, and Jack Strunk, of Army. He'd thought the invitation was for a private conference.

He and Jones were old friends long before coming to staff, having served together during the Korean War. Strunk was a more recent acquaintance and not very sociable, but even he reluctantly shook hands.

"What's this all about?" Hawkins asked.

"You know as much as we do," Strunk replied dryly. "The secretary says that there's another man coming."

"Who?"

"D'Amfino."

"Sorry I asked."

"He means," Jones explained, "that we're waiting for Carmen D'Amfino —C.I.A. We can go in when he gets here."

"Oh," said Hawkins, dropping into a nearby chair a scant instant before a civilian stumbled in from the corridor.

The civilian carried an enormous, bulging briefcase which banged against his leg with every step he took, causing him to stumble. It was chained to his right wrist.

The secretary, Pearl, rose. "You gentlemen can go in now. Mr. Ladelow's waiting." She smiled demurely and opened the door for them.

Hawkins was first on his feet. He tried to help the C.I.A. man. Between the two of them they managed to stabilize the burden and get it through the doorway.

A glance at President Ladelow told Hawkins that he was feeling down. He hardly looked up when Pearl reached in

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to close the door, and Pearl was looking extra good today.

"Sit down, please, gentlemen."

They found chairs and sat, D'Amfino choosing one at one corner of the massive desk. Straining, he lofted the heavy case onto the desktop, then began fumbling around in his pockets for the key.

Ladelow waited patiently. It was said of him that he was not a particularly bright man, or a very complex one. Certainly he did not create either impression. But he was a fresh face, virtually unknown to the masses before 1991, when he had become the candidate of the new American Conservative Party.

By profession, he was a screenwriter. He'd spent his early life obscurely cranking out grade-B mystery and science fiction movies: the awful kind —plotless, but gory.

One day that changed. Ladelow's book, *What's Wrong with the U.S. and How To Fix It*, hit the streets.

Timing was perfect. People were ready. The book rose meteorically to the top of the best-seller list. Ladelow gained disciples, particularly among the blue-collar classes.

When the American Conservative Party adopted the book as its bible, only one result could naturally follow: Ladelow became their presidential candidate. He swept into office with a mandate.

It was an awkward victory for Ladelow. The landslide included few of the party's congressional candidates, and Ladelow found himself alone, swimming upstream.

Ladelow rested his bony chin on equally bony hands, elbows on desk. He reached up with the little fingers of both hands, squared his glasses, then broke the silence. "No doubt you're wondering why you're gathered here," he said, "and why I didn't just waltz my buns over to the Pentagon to do this in style.

"By and by I'll tell you that. I think you'll see the reason for my choice. But first I want Carmen to brief you on a very disturbing development. Carmen."

"Yes sir." D'Amfino had removed a stack of folders from his case and been waiting for his cue. He turned to face the others. "I'm about to show you photographs taken three days ago by the crew of the shuttle *Grissom*. *Grissom*'s been in polar orbit for nineteen days now. Her mission is to survey low-flying Russian military satellites, determine their capabilities, and disable as many as she can.

"As a practical matter, one of their chief problems to date has been to find the functional ones, since enemy technology has heretofore been far behind ours. The result is that we've examined lots of dead ones, many dependent on battery or nuclear power and designed to eject film cannisters.

"Very recently, however—the last few months—their satellite surveillance capability has taken a quantum jump in quality. It's now equal, and possibly superior, to ours. In these photographs the implications of that will be apparent."

He passed the pack to General Strunk, who began flipping through rapidly and passing them on to Jones.

D'Amfino continued. "The reason their capability equals ours is because, basically, it is ours. You'll note that nearly all the photographs depicting modular components have printing on

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them. You'll also find a few pictures which have been blown up. Reading these will reveal that virtually no important Western manufacturer is unrepresented in one or another of the Soviet surveillance systems. In some cases you'll recognize these as our own hardware, complete to the last nut and bolt.

"This is what the *Grissom*'s crew's found in orbit—so far. There's more. Ground systems haven't been neglected either."

D'Amfino opened another envelope and handed it to Hawkins. "These will be of particular interest to you, Admiral. Look at the picture on top and tell me what you think it is."

Hawkins studied it a moment and answered without hesitation; "It's our 'Angelfish': an SSTDR—Surface To Satellite Triangulation and Distance Ranger."

"And its customary use, Admiral?"

"Keeping track of the Soviet nuclear submarine fleet."

"Who makes it?"

"We do. It's built in the Naval Ordnance Facility at Austin, Texas."

"That's where it's assembled, Admiral. What about the components?"

"Those come from manufacturers everywhere: this country, Japan, France, Israel. Many of them are off-the-shelf."

"Everything but the Boson-375, right?"

"Right; the—uh, buffalo chip's made right in the facility. Bell Labs is the contractor. But—we don't use the 375 in the Angelfish."

"We don't, but they do. Take another look: here's a blow-up."

Hawkins studied the photo. "Hm. Could be; I'm no expert." The chip, even magnified, was smaller than a match head, and one looked pretty much like another.

"Take my word for it, Admiral; that's what it is. Hillary Wolfe has made positive identification, and Dr. Wolfe *is* an expert."

"Where did the thing come from?"

"The discovery coordinates are on the back, Admiral. The buoy it was in came to us courtesy of the Royal Norwegian Navy, who fished it out after some of their oil people stumbled onto it. And I mean *stumbled*. They were doing geological surveys offshore, near Tromso, when the antenna surfaced and fouled in their rig—the thing malfunctioned. If it hadn't, we wouldn't know about it. The device is normally smart enough to make sure there's nothing around before it transmits. We were lucky to get it. You can imagine what this means to our own missile sub force."

"Disaster!" Hawkins looked as if he were going into shock.

"There's more. This time it's General Jones's turn. Tell me, General, what do you think of the *Dingbat*? What's your assessment of its offensive capabilities?"

"Mediocre, Mr. D'Amfino. Our worst is probably better, at least in terms of guidance. The airframe and propulsion systems are roughly equal."

"And in a cruise missile, General, it's the guidance that counts, isn't it?"

"Guidance is crucial. And—we have a great big edge there." As the words died, doubts rose. "D-don't we?" he added.

"That's become debatable, too. I as-

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sume you get regular briefings on the *Argus* scans?"

"Every morning. *Argus* is our newest operational orbital system. But there's been nothing unusual showing lately; certainly nothing involving *Dingbats*."

"That's what we thought—at first. Take a look." He handed Jones several photographs.

"That's not a *Dingbat*; that's a MIG-15. I shot down thirty-five of them in Korea. Uh—where'd this come from?"

D'Amfino didn't answer directly. "Look at your next picture, General. That one's raw *Argus* film. The river toward the top is the Upper Niger."

"Chad?"

"Yes sir. Look at the next picture. You'll see the MIG crash a railroad bridge right in the center of the span. And there have been at least six other occasions when *Argus* snapped similar crashes, each one involving an extremely tough target. The strength of the explosion indicates that the entire aircraft was crammed to the gills with H.E."

"Well, those rebels are religious fanatics, Mr. D'Amfino. They're fully capable of kamikaze tactics."

"Maybe that's what the Russians want everybody to think; maybe that's the reason for testing it in Chad. But it's not a kamikaze. The cockpits are full of high explosives, not human pilots. We picked up their telemetry, ran it through a simulator. Every function was identical to the *Thunderbird* cruise missiles you have deployed right now. The MIG airframe is only a camouflage for testing the guidance."

"Impossible," Jones screamed. "There has to be some other explanation."

"I'm afraid not, General. Besides, why should the Air Force be left out of the game?"

Jones didn't answer.

Long moments of silence followed. D'Amfino, observing that the president wasn't ready to take over, continued.

"The point is that the United States is losing, maybe has lost, the one thing that's kept the monkey off our backs all these years: the lead in electronics and miniature circuitry. The Russians have caught up not by duplicating our research, or even stealing our technology, but by simply stealing the hardware, itself, or buying it from our '*Allies*,' in sufficient quantity to equip their own weapon systems with it. And it may well have been that the reason we've survived this long is our ability to invent, develop, and deploy new systems faster than they can steal. That's a pretty sobering thought, isn't it?" He paused and looked at the others.

Strunk protested. "I *know* we've got leaks, but My God! man . . ."

". . . leaks—General, it's a torrent. What I've shown you in these last few minutes is nothing compared to the whole. I think the president might want to comment on that part of it himself."

"Yes, I do," Ladelow said. "Thank you, Carmen. You have the audience warmed up nicely." He chuckled hollowly, but quit as soon as it was apparent the military hadn't picked up on it.

"As you are no doubt aware, my election was pretty much a fluke. I'm the first dark horse to warm this chair since Harry Truman. Like old Harry, I

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stepped into something a lot of people think is too big for me. I intend to do my best to prove otherwise. I will concede that this might not be easy for a non-politician.

"One thing private business taught me, though, was how to adapt. Being where I was for most of my life, I got plenty of exposure to far-out ideas. I've managed to live long enough to watch a great many of those far-out ideas become everyday facts of life. Our present situation *is* far out and it *is* a fact of life.

"Now, having *superficially* touched on the problem, let me throw this question out on the floor for discussion: What should we do about it?"

This question was not rhetorical, they knew, but none knew how to answer it.

Hawkins tried. "We'll have to tighten things up, I guess. Keep the new stuff from getting away from us, regain our lead."

"OK," came Ladelow's riposte. "Fine; how? Where do we get the money?"

"Congress will have to be informed and . . ."

"Admiral, my party holds no Senate seats, and only *five* congressional. Of those five, not one is on a committee of any kind."

"*It's not a partisan issue, Mr. Pres—*"

"Wrong, Admiral. It is *very much* a partisan issue. It shouldn't be, but it is. And while it's true that there are people in Congress in all the parties who are as alarmed as I am about this, enough of them have special interests to talk any proposed countermeasures to death. Besides, the evidence suggests that it may be far too late to do anything except take bold advantage of the very fortuitous situation our own foolishness has created."

Hawkins sat there waiting for the bomb to drop. When it came, it was not directed to him.

"General Jones," asked Ladelow, "where were you on August 5, 1945?"

"Uh—I was attached to the 1069th Fighter Squadron, on Iwo Jima," Jones answered, puzzled at the question.

"And on that date, can you tell me your reaction to the Russian participation in the war against Japan? Were you pleased or disturbed?"

"Disturbed."

"Why?"

"Because it extended their power deeper into the Pacific Basin. It seemed to me we were trading Japanese rivalry for Russian."

"What was your professional assessment of Russian military capabilities at that time?"

"Formidable, sir; on land. I wasn't impressed with their air force, and they didn't have *any* navy to speak of, but their armor and artillery were excellent. I didn't relish the idea of a land war with them, and I remember thinking that we might have to fight one some day."

"Uh-huh. Did your assessment change the next day?"

"Definitely. Our atomic weapons made it a whole new ball game."

"Why?"

"Why? Because then we had the ultimate weapon. In addition to almost everything else worth having."

"Including, General . . . ?"

"Our economy and industry were intact; theirs wasn't. We had the shipping and long-range heavy bombers; they

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didn't. We could have hit them but they couldn't have hit back, even if they'd had the bomb. Having larger land forces wasn't important any more. They'd have to get to our homeland and occupy it. We simply could have destroyed theirs."

"OK. So it'd be your opinion that at that particular time we could have flattened any other power on Earth, with absolute safety, and with absolute impunity; right?"

"Absolutely."

"Should we have?"

"I'm a soldier, Mr. President. It wouldn't have been up to me."

"Give me your personal opinion, General; theoretically, had the decision been yours to make . . . ?"

"Yes, sir. Put that way, I would have."

"Without any hesitation?"

"None."

"You realize that whoever did that would later have to justify the action for history. Could you?"

"Mr. President," the general replied, displaying obvious uneasiness, "it's the winners who write the history books, so yes, I think I could have. Besides, I never saw any difference between the people we were fighting and some of our so-called allies. All we had at that time was a situation of military expediency, dictated by military realities but created by politicians. If Hitler hadn't double-crossed the Russians they would still have been *his* allies.

"No sir, I'd have to say I personally agreed with George Patton and Winston Churchill: we should have taken them on when Germany fell. We had to anyway, five years later in Korea. By then they had China, Eastern Europe, *and* the bomb. No, I don't think I would have had any trouble living with the decision."

"What about the rest of you?" Ladelow demanded.

Hawkins nodded agreement with Jones. Strunk hesitated a little, but made it unanimous.

Ladelow leaned forward toward the edge of his desk. The gesture was intended to imbue the discussion with an air of confidentiality and emphasize the gravity of the topic. It worked.

In a low, powerful voice, he asked, "Do each of you not agree that to act in a manner such as the general just suggested would be to engage in aggressive warfare, to strike first, without warning—something the United States has never done, and always considered cowardly and contemptible?"

The response consisted of the squirmings of three bottoms on three chairs.

Ladelow continued, reinforcing the tension. "Gentlemen, would it help for me to say that, given the identical decision, I would myself have acted in the manner that each of you has just indicated?"

Again there were no responses, but there were, by this time, the beginnings of grave doubts that this was idle speculation incident to an ordinary briefing session. Faces began to reflect great concern.

Ladelow pulled himself erect, reclined momentarily in his chair, then stretched languorously. Suddenly he leaped toward them like some great uncoiling spring, with new vigor in his manner.

"Forgive me the dramatics," he said.

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"These are in my blood. I know that what I have just said must make little sense to you. But there *is* method in my madness. Bear with me until I explain the rest of the mystery. In the end, history will be kind to all of us."

Taking his cue from the puzzled expressions this statement generated, he continued. "I will mystify you still further with my next proposition." He sat erect now. His face took on an extremely determined look. And when he spoke, his voice had a timbre he ordinarily reserved for speeches before mass audiences.

"I propose," he said, "that we return to 1945, that this time we do the job right. —Carmen?"

"Yes, Mr. President." D'Amfino reached deep into his briefcase, groping its innards; his actions were watched avidly by the three officers. They seemed to have taken some of the edge off Ladelow's last remarks.

Ladelow sat silently, waiting, now feeling some small regret at having used the word *madness*, though it had seemed innocent enough at the time. He hoped these men were hardheaded realists and good soldiers, that they would behave consistently with the nation's best interests.

After an eternity, D'Amfino's hand came out of the bag. It clutched a leather strap from which hung a dull sphere. He put this on the corner of the desk and said, "I borrowed this from the Smithsonian. You may have recognized it already: it's a petard, circa 1610—a primitive hand grenade containing a large charge of black powder, musket balls, and a gunpowder fuse. I emphasize: it was an *extremely dangerous* weapon, for both user and target. Grenadiers were elite troops, men of special courage, who customarily cut their fuses long, watched them burn down, and threw at the last moment, so that the enemy couldn't throw them back. Gunpowder technology being what it was in those days, with combustion rates so erratic, this made sense. But it was very easy to miscalculate, to wait too long to throw.

"Now," he said facetiously, "does anybody have a match?"

D'Amfino's own forced chuckle was the only sound. The officers watched, granite-faced.

D'Amfino reached into the bag again, drew forth a rectangular object the size of a cigarette pack and perhaps a third as thick. "This," he said, holding the object high, "I borrowed from I.B.M. Can one of you tell me what it is?"

Jones craned his neck around Hawkins. "It looks like a guidance module, an MX guidance module. Let me have it a minute."

D'Amfino gave it to him. "You are astute, General. And you are going to say it is a 345-megabyte magnetic bubble processor with inflight reprogramming capability, target selection discretion, priority mission discrimination, and constant multiple warhead monitoring and telemetry elements. Ah—and besides that, it is programmable for defensive maneuvering and decoy deployment. Is that what the manual on it says?"

"Basically; it's a smart guidance module."

"Wrong, General. It's a petard—circa 1993."

Jones handed the module to Hawkins,

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who shared it with Strunk for a moment, then passed it back to D'Amfino.

D'Amfino handed it to the president. Carmen, it appeared, had no more lines for a while.

"Gentlemen," said the president, "what I now propose to the three of you is treason, perhaps genocide, and maybe racial suicide.

"It is, however, my considered opinion that if we repeat the mistake my late antecedent made the same result will follow in a more leisurely manner. And if by some miracle we are reprieved, that the next repetition of this historic moment may come far too late to make any difference to us.

"So, since this appears to be one of those rare moments in history when defense temporarily has the advantage—an advantage arising by the fact that we can, in effect, provoke the enemy, then take control of his weapons—I propose we take the next logical step. Reprogram his missiles to destroy themselves and their launchsites, then kick him in the shins."

Jones did not know why he interrupted. Perhaps it was because the president had opened the door by requesting his opinion, which he'd subsequently given so positively. Or maybe it was because his was an honest opinion which he believed in very earnestly, and which he wished he had been able to implement. "What is it you want of *us*, Mr. President?"

Ladelow's voice had plunged into its deepest, most sincere, most powerful tone. "I want your soul, General, and your silence, and your honor, always. I want your understanding if my plan succeeds. I want you swinging from the same gallows if it does not."

"I'm listening, Mr. President."

Ladelow glanced at the others; noted no obvious dissents, and started to explain.

When he had finished, Jones turned to D'Amfino, as if seeking the assurance of someone who understood the technical ramifications of the president's remarks. "Can we do it, D'Amfino?"

"Our experts say we can. It's not 100 per cent foolproof, but what is?"

"No; I mean, have they got the 345?"

"They're deploying it right now. We estimate their land- and sea-based systems to be approximately 60-percent complete. Another few weeks and . . ."

"That means they got the modules in quantity, just after we did—which means . . ."

"Which means—and now you know: first run—our side; second run, with slight modification—for their benefit. We gave it to them, and they think what we gave them was a first-strike capability." He smiled. "The president's a fine judge of character, General. He knew he could count on you."

Jones squinted; his brow wrinkled, as if he were trying to magnify his concentration and understanding. He promptly realized that nothing anyone could do now would reverse the damage, and more importantly, that he would not do so if he could. "And now, the incident; right?"

"Yes, General," Ladelow broke in. "The incident is most important, since this is how history will judge us. Tell me: given the enemy's paranoid men-

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tality, and putting yourself in his place, what's the worst situation you could imagine?"

"Vulnerability to a first strike. But how . . . ?"

"It's in the works, General. We've got all six shuttles up there, including the old *Columbia*. Their crews are busy punching the lights out of every military satellite the Russians have up. If that doesn't do it, nothing will."

"I agree," Jones replied. "But what does that leave for the three of us to do?"

"We have to quietly alert the country's defenses without alarming the civilian population. We can certainly justify that on the basis of the intelligence we have now."

"Mr. President, that'll mean congressional inquiries. Some of these legislators are ex-military themselves. Lots have friends in the services, particularly the ones on the Armed Services Committee. There are civilian agencies whose cooperation we need to sustain alert posture. After the first few days . . ."

"Long enough, General. We need seventy-two hours, maximum. If it hasn't happened by then, it never will. Gentlemen, are we in accord?"

There followed long moments of silence. Then a head nodded, then another, and finally, a third.

"I'll be in touch, gentlemen," Ladelow said, dismissing the officers.

Deep underground, nestled in bedrock, sheathed in armor plate, and safe from all but the largest of missiles, Ladelow waited in the emergency war room for news from the other side of the world.

There were some who believed his place was elsewhere, on his flying command post where he could direct the war in greater safety. But the president was a stubborn man; he had unshakable faith in his plan. He *knew*, with absolute certainty, what was going to happen.

And it did *seem* to be happening exactly that way. Ladelow was satisfied of that. He sat calmly in his bunker office—an office much smaller than the one above, with a chair much less comfortable—sharing with General Strunk, who acted as his liaison with the Joint Chiefs in their bunker over in Virginia.

Strunk wore a headset through which news reached him in a constant flow; news he immediately passed on to the President. He looked confident now, as he reported good news. "Argus systems report flashes; radiation of extreme intensity over the Eurasian land mass."

"Anything outside their borders?"

"Not yet, Mr. President."

"Good. It's working. The enemy's missiles are detonating in their silos, just as programmed."

"More coming in now, Mr. President. Flashes are appearing at sea, many along the North American continental shelf; all three coasts. We'll have some ferocious fallout."

"We can handle that better than we could have handled what the Russians are getting. What else is happening?"

"Argus counts over 3,500 flashes world-wide, about a third of them at sea. In our hemisphere there've been four in Nicaragua alone. Cuba is occluded by huge radioactive clouds; sixteen flashes on the island, including a

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gigantic one where Havana used to be." Strunk's voice started to sound grim.

Ladelow noticed, tried to reassure him. "Had to be, General. We knew there'd be heavy civilian casualties, radiation levels elevated for decades, but we can deal with that as long as we're strong, and as long as the industry of the free world is reasonably intact. Without an arms race to suck us dry, we can rebuild in no time; make a better world than ever before."

All at once Strunk was shouting, voice taut, pitched high. "Sir—Argus reports missiles in flight, coming at us from over the pole."

"Detonate them."

"Sir we can't. They're Chinese."

Ladelow, on his feet, stared at Strunk. "What do you mean, we can't?"

"We tried, Mr. President. The Chinese system doesn't respond to reprogramming. They must not be using our modules."

"Everybody uses our modules."

"They had their own system; a design primitive by our standards, very inaccurate. But with the megatonnages they throw they might not have to be perfect. One thing's certain: you and I probably won't survive their attack."

Ladelow's voice was now somber, but resolute. "How long, Strunk?"

"Time of flight from Chinese launch sites is nineteen minutes, thirty-three seconds, plus or minus twenty seconds. That's to Washington, of course. It's too bad we didn't build that ABM system back in the sixties."

"How many missiles, Strunk?"

"Sixty-eight."

Ladelow pressed a button on the wall and spoke into the intercom. His voice came out trembly. "Start the launch sequence for the China strike."

Releasing the button, he took a key from a chain around his neck and jammed it into a keyhole in his panel. The panel's video screen bloomed into full color with the florid face of General Carroll J. Jones. Ladelow knew that seconds before Jones had placed his own key in his own lock and given it a quarter turn to the right. Through the video they gazed into each other's eyes for long moments. Not a word was spoken, but each knew now what before neither had been willing to contemplate: the world was ending.

Fifteen minutes later the world *had* ended for both of them.

Elsewhere, the shards of Earth clung to life. President Chandra Singh greeted General Kamud warmly and offered him tea. The general accepted gracefully and waited to hear what his president had to say.

His president obliged him, being a blunt man. "Has it occurred to you, General, that the Western powers have made quite a mess of things?"

"It has, Excellency. Fortunately, they are no more."

"Ah yes, General. But we are. And perhaps, at last, fortune smiles on us. Consider: we are untouched by their foolishness, aside from residual radiation. Planetary wind patterns protect us, and our population is large enough to absorb a great many casualties without harm to the nation as a whole."

Kamud was puzzled by this last remark, but in true Eastern fashion he did not let this show, waiting for the president to continue.

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"What year is it, Kamud?"

This time Kamud lost control. His face reflected frank consternation. So did his voice. "1993, by the Christian calendar, Excellency."

"No, General; it is 1945." He paused and sipped his tea, allowing his guest the interval to agonize. "I mean that figuratively, of course. For us, the chance has come."

"For what?" In his bewilderment, Kamud omitted the salutation.

Singh did not notice, or perhaps did not care. He was intent on following his thought. "Consider, General: to the north, Russia and our old enemy, China, are now deserts. Those remaining live like animals. Europe is prostrate. Its population is decimated. Radioactive dust covers much of the land. America is worse off; and to the east the Japanese choke on the westerly winds.

"What is left? We are. We, *and* the nations to the south. But all our neighbors are primitive, a step or two above feudalism. None can match us, either in military or in economic power.

"True, there is Australia, which does not possess atomic weapons. And there is Indonesia, who cannot match our numbers. Africa seethes with unrest. As always, her wars are constant, but fought with spears and arrows. South Africa possesses both modern arms and modern industry, but is preoccupied by racial strife and border conflicts soon to bury her. That leaves few in the world who can truly challenge us, General."

"There are still large technically advanced countries in South America, Excellency."

"Ah, yes, General. And I must say it was very astute of you to remind me, since I was about to comment on that very fact. You see, next to us, they have the strongest industrial base, but they are presently inferior to us both in numbers and weaponry.

"They must not be given the opportunity to fill the vacuum the former superpowers left. We must not repeat the mistake America made in 1945; we must take the next logical step and fill that vacuum ourselves: dominate the world. Do you understand me, General? More importantly, do you agree?"

Kamud considered these words for long moments. Then, imperceptibly at first, his head began to nod. As time passed, this gesture became vigorously positive.

The yacht *San Martín* rode at anchor in the Plata Estuary. At her rail stood, in magnificently tailored uniform, President Lucimo De Sa. He watched as a launch slowly approached from the opposite shore.

Its image grew steadily, until individual figures could be discerned. De Sa could see a tall man standing straight at the bows, wearing a uniform that rivaled his own in splendor.

At length, the launch reached the yacht and tied up at her gangplank. The stranger stepped over the *San Martín*'s gunwale and strode up the ladder. De Sa greeted him: "It was good of you to come, Generalísimo."

The other replied, sounding genuinely friendly: "It is in my country's interest for me to be here, Señor Presidente. Our two countries have for too long held themselves aloof from one another."

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"Times have changed. May I offer you some wine in my cabin?"

"Indeed." The generalísimo followed the president below.

Seated at a small damask-covered table, they sipped wine and talked statecraft.

"Together, Generalísimo, we two represent the most powerful force in the world: the strongest industrial bases, the largest naval forces, and the strongest economies. Only the Indians can match us in manpower, and they are otherwise weak."

"They have nuclear weapons, Señor Presidente."

"And we do not? Come now, Generalísimo; we meet as friends. Friends have no secrets from one another. What is the point in denials? We have them, and so do you."

The generalísimo did not reply.

Taking silence as confirmation, the president went on. "Has it occurred to you, Generalísimo, that history repeats itself?"

"It has." The generalísimo sipped his wine. "I see certain opportunities for our two nations to cooperate, if that is what you mean."

"Ah, you read my thoughts. Good. I am thinking that fate has dealt us a winning hand at last, Generalísimo. No longer do we live in the shadow of the Yanqui. He is no more. His enemies are gone, too. All of the northern hemisphere of this planet lies in ruins, while we in the south are relatively untouched. If we two combine, the rest of the world is pawn. We alone possess the power to dominate the Earth."

The generalísimo reflected. "You forget India?"

"Ah, yes, India: vast in population *and* backward. We must take the next logical step with respect to India: crush her before her numbers overrun the nearby lands, before she has time to consolidate her gains. We must not, in any event, repeat the mistake the Yanqui made at the end of World War II. Do you not agree?"

Waves lapped at the sides of the *San Martín*, slapping noisily and on occasion throwing up spray. It was a pleasant enough sound, not loud enough to drown out the conversation which was taking place in the cabin belowdecks.

Rolando Barroso, the young sailor on sentry duty outside, could hear the clinks of two glasses striking in a toast, and the voices which in unison shouted, "To 1945."

Rolando was only 22, and he was not a scholarly person. Still, he searched his memory, trying to remember what he knew of history; what of significance had happened in 1945.

He could remember nothing special about that year. Perhaps it was so unimportant he simply had forgotten. He turned his gaze back to the lapping waves, forgetting the words of the toast.

In a little while, so did the rest of mankind—what there was left of it. ■

● A strong conviction that something must be done is the parent of many bad measures.

Daniel Webster

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The Alternate View

HOT HOUSE OR ICE BOX?

G. Harry Stine

It should be immoral to use scientific-like methodology or language to scare people either for the sake of senationalism or for the covert purpose of establishing control over them. Doing this not only weakens the acceptability of honest scientific endeavors because of the "cry wolf" syndrome, it also diverts activity from solving real problems caused by the social impacts of science and technology.

I recently received two documents within days of one another. The first was a government report, "Can We Delay A Greenhouse Warming?" The other was a book on ice ages and their effects on climatology, or vice-versa. I've read both, digested their contents, and evaluated what they both say. I tried to compare this against what I know about the real world from a father whose hobby was meteorology, plus more than 2,200 hours aloft guiding a general avation airplane through the decidedly dynamic atmosphere of Planet Earth. Thus, I tried to look at the data with a perspective that many people don't have because the data is conflicting.

I learned about the first document the same way most other people did: a scary, sensational report on the TV evening news. I consider it to be a prime example of the use of semi-scientific methodology to scare people for various purposes. Many people accept at face value what they're told by TV news or newspapers. Having been a science consultant for a major TV network as well as having had some of what I've done reported "factually" in newspapers, I assign a low credibility factor to these two popular sources. So I obtained a copy of "Can We Delay A Greenhouse Warming," by Stephen Seidel and Dale Keyes of the Strategic Studies Staff, Office of Policy Analysis, Office of Policy and Resources Management, Environmental Protection Agency, Washington DC, GPO document number 055-000-00235-5. I present this bewildering array of information in case you want to get a copy and see for yourself whether or not I'm reporting truthfully. And because you should know which government bureaucracy is trying to gain power over you. (The prime purpose of any bureaucracy is survival, the second purpose is growth, and the only way it can accomplish either is to take power away from free people. This may be considered to be editorializing, but it is a statement based on evidence as solid as any utilized by nuclear physicists, for example.)

The EPA report discusses what is to them a foregone conclusion: That our industrial and other energy activities will increase the amount of carbon dioxide in the Earth's atmosphere, thereby acting as a reflector for the long wave-

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length infrared radiation that's bounced back into space by the Earth. Not all of the solar energy impinging on our planet is absorbed; it's re-radiated into space at a longer wavelength. Upset this balance, the hypothesis says, and the result will be change in the average temperature of the planet's atmosphere. Additional CO_2, it is theorized, will increase the Earth's temperature by what is called "greenhouse effect."

The "scientific" basis for the assumptions in the report are specious. They're based upon incomplete computer models, including a "one dimensional" atmospheric model. In *one short paragraph* buried in the introduction, the EPA authors admit that the global climatic system is "extremely complex" and that it consists of many interrelated components that are "only partially understood." They admit that nobody knows how long CO_2 remains in the atmosphere or what the interactions might be with other climatic factors. But these qualifiers are effectively buried in the report.

Having thus cleansed themselves, however obscurely, they proceed to develop scenarios, conclusions, and recommendations based upon treating their assumptions as hard-data fact. Sprinkled liberally throughout the report are qualifying phrases such as: "assuming that," "it is possible that," "it is likely that," "given the potential," and "it is reasonable to assume."

One of the many odd hats I wear is that of chairman of a technical committee of a national voluntary standards organization. I'm therefore experienced in writing standards, codes, and other para-legal documents in which some aspects are considered mandatory while others may be only advisory. There's a huge difference in what is meant when the words "shall" or "should" are used, for example. I can recognize a weasel-worded phrase quite easily. I also understand the difference between positive and qualified statements. The EPA report is rife with the latter. But few people have this sort of expertise in the English language, and they'll accept hedged statements as the absolute truth.

The EPA report concludes that the average global temperature will rise by 5° C by the year 2100 because mankind's increasing use of fossil fuels will result in an increase in atmospheric CO_2. They base this conclusion on "well documented" data. However, only two data points are referenced. The first is an estimate made in 1890. The second is a curve of monthly atmospheric CO_2 levels taken between 1958 and 1980 at Mauna Loa, Hawaii, on the slopes of an active volcano.

Recommendeth the EPA: Since the use of fossil fuels can't be stopped entirely right now, the onset of the "greenhouse effect" can only be delayed. The best way to do this is to decrease the use of fossil fuels by "making them too expensive." Therefore, the EPA recommends a fuel tax of 300% of market value until use has dropped to the level where a ban can be effectively put in place.

What else might we reasonably expect from a government bureaucracy? It reminds one of the apocryphal story of the legislator being toured through the research laboratory and asking, "Of what possible use is your new discov-

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ery?'' Whereupon the research scientist candidly replies, ''Someday you'll tax it.''

The second document is the book, ''Ice Ages,'' by Windsor Chorlton published by Time-Life Books. Any scientific Time-Life Book is well-researched, thoroughly reviewed by knowledgeable people in the field, and is as accurate as current data permits. The investigators in the field are still arguing with one another, which is an optimistic sign that progress is being made, albeit slowly. The book notes that we went through a Little Ice Age from the 15th to the 19th centuries, followed by a warming trend that ended in the early 1960s, followed by yet another drop in average temperature that's lasted to the present. It candidly presents most of the plethora of factors which are believed to impact the Earth's climate in the short- and long-term. The interactions of all the factors are little understood. The eccentricity of the Earth's orbit about the sun changes. The Astronomical Unit changes. The orbital nodes precess. The Earth's axis of rotation not only precesses but wobbles. The solar constant isn't; it's a variable constant. The effects of the solar wind on the upper atmosphere aren't well understood, and the interactions between the electron density of the upper atmosphere and climatic factors are little known. Along comes El Chichón, and all the hypotheses go out the window as reams of new data come in. What caused El Niño, and what are its global effects? Nobody knows.

Our data base is really very small. We've been measuring some factors for 25 years or less. Until the International Geophysical Year of 1957–1958, we didn't have satellites for either solar or terrestrial observation and measurements. Nor did we have instruments of suitable accuracy to measure some of the variables. (It is interesting to note that the current concern of EDB concentrations of parts per billion couldn't even have been detected, much less measured, a quarter of a century ago. The best the chemists could do then was parts per million, maybe.)

The Earth is a huge and dynamic system made up of an unknown number of variables related in unknown ways. We simply do not yet know enough to make the sort of forecast the EPA report tries to pass off as a prediction in order to gain bureaucratic control over natural resources. What data base or methodology does the EPA have that warrants our acceptance of their 100-year forecast of climatic change and the ''energy policy'' they derive from this? Another government agency, the National Weather Service, whose job for over a century has been to observe and record the weather, can perhaps predict the weather 24 hours in advance and produce a reasonably accurate 48-hour forecast if conditions are right. (One gets very intimate with the weather in a general aviation airplane. In fact, a pilot sees weather in three dimensions and gains a different perspective on the weather as well as the planet.)

The situation is remindful of the definition which contains as much truth as humor: ''A scientist is one who passes as an exacting expert on the strength of being able to turn out, with prolific fortitude, strings of incomprehensible formulae calculated with micrometric precision from extremely vague assumptions based upon debatable figures obtained from inconclusive tests and quite incomplete experiments carried

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out with instruments of problematic accuracy and by persons of rather dubious mentality with the particular anticipation of disconcerting and annoying a hopelessly chimerical group of fanatics altogether too frequently described as the Grants Review Committee."

Are we going to burn up or freeze? We don't know the answer. Anyone who tells you he has the answer doesn't. He's got an axe to grind, whether it be the lure of power over people or the need to obtain more research grant money. The latter can and should be accommodated, because the answer will come only from continued collection and correlation of data, a task we've just begun.

What about the threat of the greenhouse effect? It's about as probable as a new ice age. Take your pick. But don't bet on either. The only rational approach is Ted Sturgeon's: "Ask the next question."

Boy, do we have a lot of them! ■

● (to college students): I wish that on your television screens there might have been a Tom Paine, a Sacco and Vanzetti, an Abraham Lincoln, men who understood the moral imperative and spoke out not just in defense of the unpopular cause, but on the attack for what they believed. I don't believe you've been privy to much awareness of the moral imperative. Your twenty brief years have exposed you to political expedience, to charisma, to the glib, the honeyed, the ancient fictions thrust at you as rhetoric. But rarely, if ever, have you been exposed to naked courage. Rarely, if ever, have you witnessed the selfless sacrifice of career and fortune because a giant must occasionally emerge from midgets. Your lot, and mine, has been an over-exposure to the midgets, the angry little men, the perpetual office-seekers, the posturing push-button products of politics built out of plastic and cigar smoke. The hatchet-wielders who generalize all villainy and indiscriminately tag all those in opposition as "subversive," or stupid, or somehow suspect.

Rod Serling

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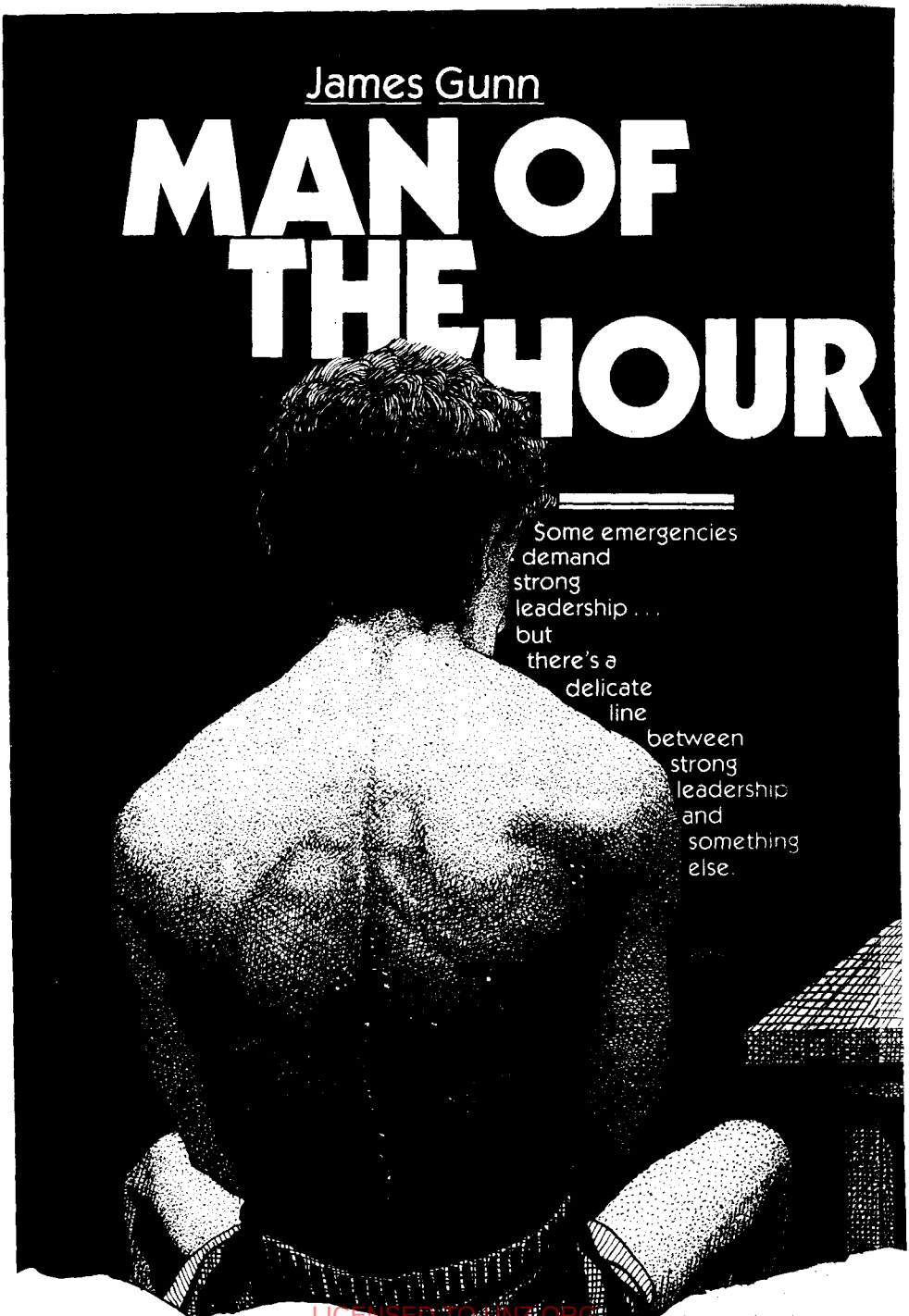
James Gunn

MAN OF THE HOUR



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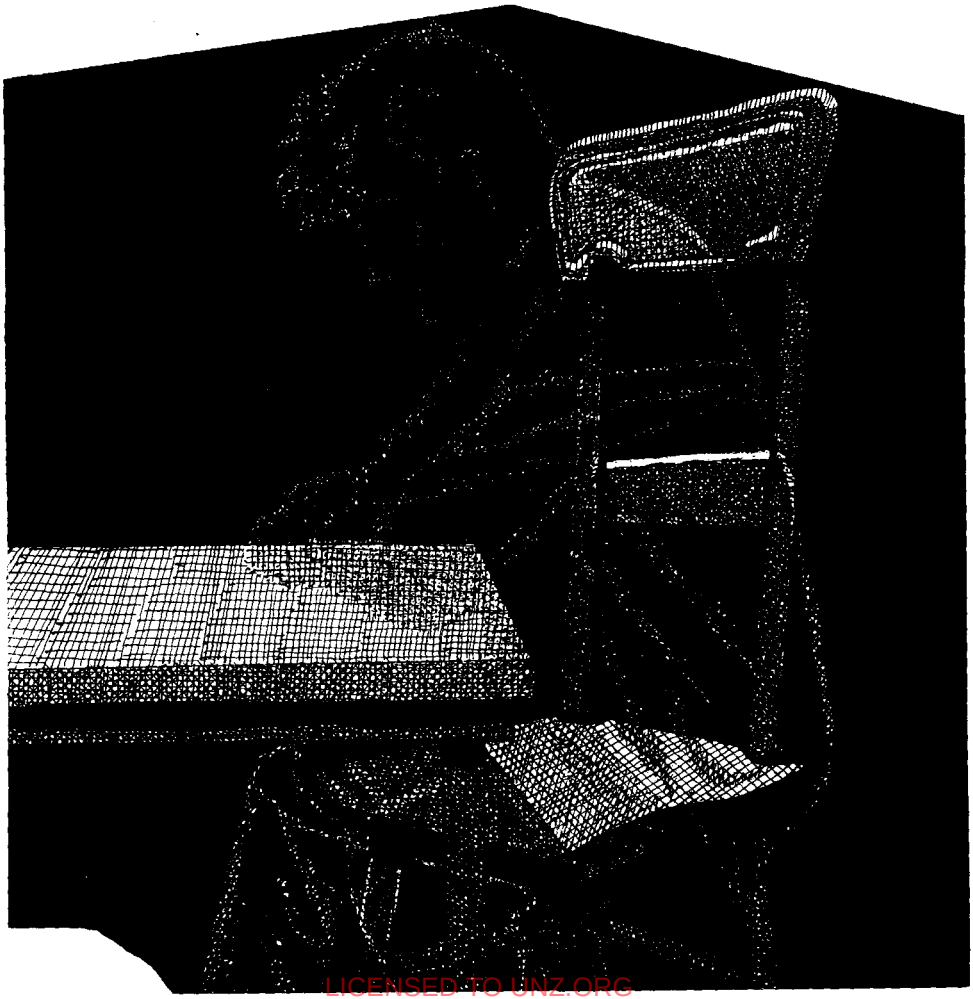
The first thing he saw when he opened his eyes was the audio cassette dangling by a string from the remains of a metal light fixture surrounding a naked bulb in the ceiling. The bulb was dark but the room was partially illuminated by the sunlight streaming through rips in the blind that tried to shade the window to his right.

The room was small, no more than twelve feet wide and fifteen feet long, and it was dirty in ways that no sweeping and scrubbing could eradicate. The room was hot. The window was half raised, and occasionally a gust of humid air would flap the shade and roll the dust kitties across the floor and rattle the heap of insect carcasses on the scarred wooden table under the light.

The man on the bed who did not know his name rolled onto his side and then sat up, his feet flat on the sticky floor. He was a pleasant looking young man with curly brown hair and dark eyes and a well-shaped but not heavily muscled body whose skin had a brown cast to



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it. He was about five feet ten, not tall enough nor short enough to be noticeable. Nothing about him was remarkable. His chest was hairless. He had been sleeping in his boxer shorts.

He stood up, testing his balance as if he had to think about it, wiggling his fingers, his arms extended, as if to check the messages his nerves sent up his arms to his brain, rotating his shoulders experimentally. He reached the table in the center of the floor with two short steps, and reached out for the dangling cassette. He pulled it free with one hand, breaking the string that held it to the ceiling fixture, and turned it over. Something was printed in neat small letters on the sticker attached to it. "IMPORTANT INFORMATION," it said.

The man looked around the room. Three battered wooden doors were set into adjacent walls. One of them was narrower than the others and occupied a sill six inches off the floor. Behind it was a bathroom tiled in black and white plastic squares; nearly half the tiles were missing. When the man came out he put on the clothing he found hanging in a closet behind one of the doors. The clothing was neater and newer than the room: a light blue dress shirt, a pair of gray slacks, a gray tweed jacket, a pair of brown shoes, relatively unscuffed, fairly recently shined. An old suitcase stood in the back of the closet.

On the table was a small heap of belongings: a few coins, a hotel key with the number "506" incised into it, a black pocket comb, and a billfold. In the billfold were three dollar bills, a pawnshop ticket, a Visa credit card, and a plastic-encased social security card. The credit card and the social security card carried the name "Bill Johnson." The credit card had a note attached to it with a paperclip. The note was printed on yellow, ruled paper and said, "This card is overdrawn. If you try to use it, you may be arrested." The man removed the note and put it into his jacket pocket with the paper clip, put the cards into his billfold with the dollar bills, picked up the cassette and put it in the other pocket.

Behind the third door was a dim hallway lighted only by a gray window at the far end. Halfway down the hall the man came upon the dejected black metal doors of an elevator. When he pushed the button beside the doors, he heard no movement, no response, distant or near, and he turned and walked to a nearby stairwell. Five dark flights of stairs down, the staircase emerged into a dusty lobby.

From behind the desk to the left a thin, sour voice said, "Mr. Johnson. I hope you have the money to pay your overdue bill. Otherwise—"

"I'll get it today," the man said. "Tomorrow at the latest. Is there a store near here where I can play a cassette?"

"If I were you," said the man behind the desk, who had risen to his feet and leaned bony elbows on the counter, "I'd worry about getting a job and not about no music."

"It will help me get a job."

The man behind the desk jerked his head toward his left shoulder. "Just down the street there's a music store," he said. "Least there was. Maybe they're still in business." His voice was skeptical but a bit less strident.

"Thanks," the man said.

"How come you don't say 'may the

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future be kind,' " the desk clerk asked in a tone that was almost friendly, "like you always do?"

"May the future be kind," the man said.

A hot merciless wind blew down the nearly deserted street, carrying dust and bits of paper. No cars were parked along the curb, but here and there a stripped hulk appeared like the bones of a dinosaur unearthed from strata of garbage and old newspapers. No cars disturbed the potholed streets. Here and there solitary figures skulked along the boarded store and building fronts, but they no longer had the spirit to be dangerous.

One approached the better dressed man and held out its hand in ritual but hopeless appeal. He put a dollar in it. As if by magic, ragged children appeared with their hands out, and the man gave away his other dollar bills and the coins in his pocket before he demonstrated that his billfold and his pockets were empty and the beggars disappeared as quickly as they had assembled.

Like the rest of the world, the music store had seen better days. Actually it was a used music store, with long-playing records in battered cardboard envelopes racked in bins and cassettes, with and without plastic cases, tossed into heaps on table tops. An aging young woman with long, black, uncombed hair stood behind a counter toward the front of the dark shop.

"May I listen to one of the cassettes?" the man asked after a moment of standing in front of the woman without being noticed.

With a slow wave of her right hand, the woman motioned toward a dingy, glassed-in booth at the back of the shop. In the glass booth he slipped the cassette from his pocket and placed it in an old machine that seemed fastened to the counter. When he clicked the cover down and pressed a lever marked "Play," a voice boomed out. Quickly he turned down the volume to where he could barely hear it.

". . . name is Bill Johnson," the cassette play said imperfectly. "You have just returned to her mother the little girl who will grow up to perfect the thermonuclear power generator, and you don't remember. You may find a small item in the newspaper about it, but you will find no mention of the part you played in recovering the girl.

"For this there are several possible explanations, including the likelihood that I may be lying or deceived or insane. But the explanation on which you must act is that I have told you the truth; you are a man who was born in a future which has almost used up all hope; you were sent to this time and place to alter the events that created that future.

"Am I telling the truth? The only evidence you have is your apparently unique ability to foresee consequences —it comes like a vision, not of the future because the future can be changed, but of what will happen if events take their natural course, if someone does not act, if you do not intervene.

"But each time you intervene, no matter how subtly, you change the future from which you came. You exist in this time and outside of time and in the future, and so each change makes you forget.

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"I recorded this message last night to tell you what I know, before I had to pawn the recorder for money to make a partial payment on the room, just as I learned about myself a few days ago by listening to a recording like this one, for I am you and we are one, and we have done this many times before. . . ."

After the voice stopped the tape continued to hiss past the sound head while the man named Johnson stood in the dust-covered, glassed-in booth staring through the darkened store toward the glowing rectangles of the door and the front window. Then he shook his head as if to loosen the cobwebs inside it, stopped the player, retrieved the cassette, and slipped it into his pocket.

He walked to the front.

"Sorry," he said. "Do you know where I might get a job?" The woman didn't respond. "Do you have any idea where a man might apply for a job?" Johnson asked again.

The woman waved her left hand. Johnson opened his mouth as if to ask again when he glanced in the direction the woman had waved. Across the street was a billboard in a vacant lot where a building had been torn down. On the billboard was the picture of a man with white hair but a youthful, tanned, strong face. The face was serious, concerned, sympathetic. Beside the face were the words: "Out of work? I'll hire you." And below that, in smaller letters: "Apply at—" Then came an address in slightly different letters, as if the poster had been printed without them and the address inserted afterwards. Under the picture was a name in letters as large as the message: "Arthur King."

Johnson looked at the billboard for a long time, much longer than necessary to read and understand the simple message. His eyes were open and slightly unfocused, as if he were not so much looking at the billboard as beyond it. Then he shook himself like a person trying to rid himself of unwanted thoughts. "Thanks," he said. He paused at the door and looked back at the woman. "May the future be kind."

She did not reply.

The employment office was in a distant part of the city that Johnson learned was Los Angeles, and it took him more than two hours to walk there. The office was located in a warehouse jury-rigged with portable plastic partitions and fluorescent light fixtures dangling from chains and cords, and cords snaking across the floor. The building was in a district with small factories and other warehouses, but here the atmosphere was different. The wind was still hot, but the streets had been swept, cars and trucks moved along them, the buildings were occupied, and people walked on the sidewalks as if they had a destination and a purpose. Above the warehouse and most of the other buildings was a sign that read: "King International."

After the street the warehouse was cool and dusky. A large bare room was filled with people. At first they seemed like an unorganized mob, and then order began to appear. They formed a line beginning at an open doorway in a wall forty feet from the entrance and serpentining its way to cover most of the space between the side walls that were almost twice as far apart as from front to back.

People came through the door behind Johnson and brushed past him to join

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the near end of the line before he, too, went to stand in it and was, in turn, followed by others who kept coming and coming until he was merely a part of a process. Uniformed men and women with the words "King International" embroidered within an oval on their left breast pocket kept it a human process, however. They moved among the waiting jobseekers with folding chairs, coffee, soft drinks, doughnuts, and words of encouragement. "Please be patient," they said sympathetically. "Don't worry. There are jobs for everybody. But it will take a little time."

Behind Johnson someone snorted. "A little time," a cultivated voice said scornfully. "It's taken five years."

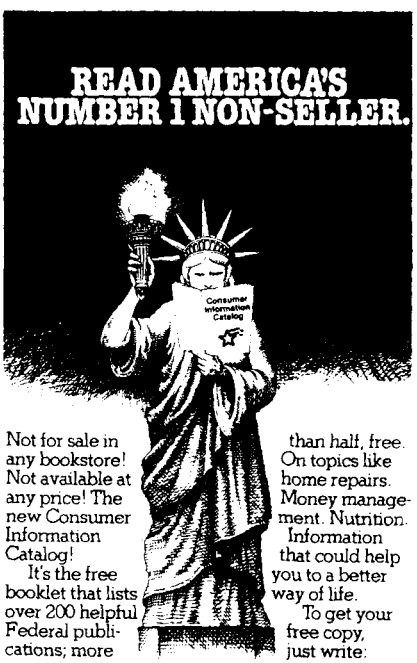
Johnson turned. The man behind him was lean and middle-aged. He had iron-gray hair and bushy eyebrows and a face that looked as if it had been carved from the side of a mountain, but as he noticed Johnson's gaze the stone turned into a sardonic smile. "Howdy, friend," he said in an imitation of midwestern neighborliness.

"I'm very well," Johnson said, "and how are you?"

The other man dropped his pretense when he heard Johnson's voice. "Better than I have been," he said. "There's been a lot of misery around, and I've had my share."

His name, he said, was Robert Scott, and he had been a professor of political science in the days when society could afford universities and people could afford to attend them. But he had been released—"terminated, in the language of the profession"—during the early days of the Depression, and ever since he had been unable to find work except for some editing and ghost-writing assignments that had dwindled into proofreading and then to nothing. "I worked my way through college as a television technician—I was the one who kept the red light under the camera in working order," he said with self-deprecating humor—"but there hasn't been anything in that line either. King has its own communications section."

Johnson did not talk about himself. Instead he brought the conversation back to King's offer to hire anyone who was out of work. Scott agreed that King would have to keep his promise, even though it might stretch the resources of the world's biggest conglomerate, but wondered why he waited so long. Then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he suggested, in a lower voice, that King was one of the few companies that had prospered during the Depression, that it had bought up a lot of distressed industries recently and farms at bargain prices, and had negotiated a batch of contracts that would be real money-makers if the economy picked up and people started buying again. People King hired, he said, were going to spend everything they made, and it was going right back into King's pocket, plus the money from the people King didn't have to hire, plus the increase in prices as the economy improved.

King, Scott said, glancing around warily, was doing what the government was too cumbersome to do; sometimes—like waiving the minimum wage—what was politically impossible to do.

"If government can't get the country out of a Depression," Johnson said, "surely we should be grateful to someone who can. Even if he makes a profit at it."

"Grateful?" Scott said. "Sure. And if it's only profit King is after, I guess the world can survive that. It survived Henry Ford, who paid his workers five dollars a day during a Depression when the standard was less than half that, and they made him a billionaire. But I've got a feeling there's something else behind this, and I'm going to find out what it is."

But soon it was the end of the day, and they had nothing to show for their wait but a card attesting to their place in line.

By the middle of the second day Johnson and Scott were allowed to pass through the far door with a group of ten other applicants. They faced a corridor with a row of cubicles on either side of it and a man and woman in uniform passing out questionnaires and forms and pencils.

"So long, Johnson," Scott said. "Good luck. Keep in touch." He smiled ironically.

"That might not be so easy to do," Johnson said. "But I have a feeling we will meet again. And good luck to you. Whatever you do, don't give up."

"I won't," Scott said grimly. "I'll keep digging."

"I know you'll do that," Johnson said. "I mean on life and people. Give them a chance and they'll come out the right way."

"I think you believe that. I hope you're right." But Scott shook his head as he accepted papers and pencil.

The cubicle was not much larger than a voting booth. It held a small table and a chair. Johnson sat down and filled out an employment questionnaire and a psychological evaluation form; it took him a while. By the time he was done Scott and all the others with whom he had been admitted were gone. The uniformed woman who took his papers told him to return the next day for an interview.

The next morning Johnson was admitted to the presence of a weary interviewer, a dark-haired young woman in tan slacks and a blouse. In other circumstances she might have been beautiful, but she was involved in a process that evaluated people in terms of skills and numbers.

Johnson smiled warmly at her, but she did not look up from her computer

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screen as he sat down in the chair beside the desk.

"Bill Johnson?" she inquired. He admitted that was who he was. "Bill, not William?" she continued. He confirmed that. "You have some curious gaps in your past history. No birthdate? No parents? No schooling? No—"

"I have some curious gaps in my memory," Johnson said.

"Why is that?"

"As I noted on the questionnaire, I seem to have attacks of amnesia."

She looked at him for the first time and frowned. "Are you under treatment for this condition?"

"There doesn't seem to be anything anyone can do." It was not an answer to her question, but she didn't seem to notice.

"Well," she said, "there doesn't seem much you're qualified for."

"Perhaps something for which a lack of prior attachments might be an asset?" Johnson suggested.

She looked at her computer scope and punched a couple of keys. "You do have an unusual psychological profile: high empathy, low self-interest, high loyalty, low acquisitiveness, high trustworthiness, low—"

"Surely there's a job for somebody like that."

She gave him a quick suspicious glance and pushed more keys. "Your written responses would have to be checked by professional psychologists on our staff, of course—"

"I understand."

"Because you could be falsifying your answers—"

"I've been totally candid."

"But you might be qualified," she said reluctantly, "for a special position that we've been asked to fill." She looked at him defiantly before her expression began to soften in the face of his calm concern. "We do get people who try to fake the questionnaires," she said. "It doesn't work. Not for long, anyway. We have ways to cross-check everything. But the official information about you in the social security and credit files doesn't contradict your statements."

"Aren't those confidential?" he asked innocently.

She looked at him scornfully and pressed another button. The desk began to talk to itself and then a chart unrolled from a printer beside her. She tore it off and inserted it into an envelope with a King International return and a pressure seal. "The psychologists will catch you up in any contradictions. This is to be handed to the woman at the desk down the hall—unopened."

He stood up and accepted the envelope. "May the future be kind," he said.

"Good luck," she said and smiled. It was a warm and honest smile, and it transformed her face. "Don't open the envelope," she said.

It was a test, of course—one of many. But none of them tripped him up, and neither did the psychologists to whom he talked at great length, answering their questions and taking their tests. A day later, with all his belongings, few as they were, packed into the shabby suitcase from his closet and a small advance against his salary gone to pay his back rent, he was driven in an inconspicuous brown automobile through the streets and freeways of a Los Angeles grown

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gray through five years of Depression, but almost free of smog as industrial activity and automobile exhausts dwindled toward zero.

The trip continued in silence for almost an hour as they passed through a decent, middle-class suburb that had survived hard times better than most. Against the foothills of the San Gabriel mountains, as the houses dwindled behind, trees began to line the road and then cluster into a small forest as the car turned off the highway onto a road leading toward the mountains and what seemed like a modest ranch house.

They came to a metal gate that swung open as they approached. It was set between inconspicuous brick pillars on which small, restless cameras were almost unnoticeable, and chain-link fencing set between brick columns was invisible until one was upon it.

This was the home of Arthur King.

The King mansion was a fantasy world. Like Alice falling down the rabbit hole, the intruder saw vast vistas open in front and surprises lurk around every turn. The world outside was a grim reality that gritted between the teeth; the world inside was spotless and shiny. It gleamed in Johnson's eyes as he entered so that he could only discern the outline of the uniformed guard who patted him down efficiently. And as the spotlight dimmed, the walls of the entranceway remained milkily translucent, as if they concealed secrets like a metal detector and a fluoroscope.

The flagstoned entranceway opened into a hallway that surrounded a glass-walled atrium, filled with cactus and other colorful desert plants as well as lizards and snakes and birds. Johnson had only a moment to gaze at it, however, before a door opened automatically on his left as if commanding his entrance.

Inside was a library. The walls were lined with books in uniform editions, except for an opening in the right wall for a door. The dominant feature of the room was a massive wooden desk, so large and intricately carved in dark walnut and tooled greenish-black leather, like the chairs and sofa, that it had to be one of a kind. It even made petite the figure of the woman sitting behind it, who beckoned slowly to Johnson with her right hand upraised and her fingers curling toward her face. As Johnson approached the desk, however, he could see that the woman was not small; it was the desk that was large.

The woman was attractive but her face and body had been shaped by discipline and the habit of command. Her hair was dark with single strands of gray, her face a pattern of planes and triangles, her body tall and trim in a black, tailored dress, and her eyes like the hooded gaze of a falcon, watchful, unwavering.

"My name is Jessica," she said, as if she neither had nor needed a last name, "and I am the manager of this household. You are Johnson," she went on, as if providing for him the necessary baptismal function, "and you will be paid two hundred dollars a week after deducting the advance. Twenty-five dollars of that will be in U.S. currency, one hundred seventy-five in King scrip." Johnson opened his mouth, and she held up her hand. "Those are the same arrangements offered all new King em-

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ployees. The scrip is exchangeable at King stores of all kinds and shortly is expected to be accepted at other stores. All this is academic since you will be living here—you will have a room below in the employees' quarters. You have a private bath, but you will eat in the employees' mess, also on the floor below. You will be on call twenty-four hours a day, and you will have no occasion nor need to spend money. Is that understood?''

Johnson nodded. Jessica's gray eyes appraised him before she went on, her voice not quite so peremptory. ''You will be the personal assistant to Mr. King himself,'' she said. She glanced at the other door to the room and back to Johnson. ''You will do anything Mr. King tells you to do, and, in time, anticipate his wishes before he makes them known. This will include but not be limited to carrying messages, bringing mail, fetching drinks, picking up newspapers or magazines where Mr. King may leave them, listening to Mr. King whenever he chooses to speak to you but never when he is speaking to anyone else in your presence. You will never, never touch anything on Mr. King's desk, and you will never, never, never mention to anyone anything about Mr. King or his affairs.''

She did not ask this time if Johnson understood, but her gaze still was on his face and he nodded anyway.

''Mr. King has had other personal assistants who were unsatisfactory in one way or another. They all had to be gotten rid of.'' She did not elaborate on the fate that had befallen Johnson's predecessors, but her expression grew a bit more severe as she said the words, and it was clearly an end to be avoided.

Johnson nodded again, as if to indicate that it would not be necessary to ''get rid of'' him.

''It is the business of all of us to free Mr. King from the concerns of everyday living that might keep him from his great work,'' she said reverently. King's ''great work'' elicited a religious feeling from Jessica.

Johnson did not ask what that great work was.

''Mr. King's wife and daughter live with him in the living quarters on this floor, Mrs. King in the bedroom connecting with Mr. King's, Miss King on the opposite side of the atrium.'' From her tone Jessica did not care much for Mrs. King and even less for King's daughter. ''You will address them as Mrs. King and Miss King. If either of them asks you to do something for them, you will pass the request on to another member of the household. You must be free at all times to take care of Mr. King.''

Johnson nodded.

''Do you speak?'' Jessica asked.

''Only when necessary.''

Jessica's face thawed into a wintry smile, as if she would have been happier in a time when it was standard practice to remove the tongues of personal servants. ''I think you'll do, Johnson.''

''I'll do my best,'' he said. His smile melted Jessica's expression into something resembling spring.

''I think you will. Sally? You will show Johnson around the living quarters and then to his room.''

Johnson turned to the door through which he had entered the library. There,

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summoned by some mysterious agency, was a young woman dressed in the black uniform of a maid. When Johnson reached the door and turned back to thank Jessica, she already was busy at the desk doing something that took all her attention behind the raised tooled leather of the desk top, while to her right several shelves of books had swung open to reveal the glowing screens of television and computer.

Where Jessica was all command, Sally was all sweet compliance. "That is Mr. King's bedroom," she said about the first closed door they came to on the left. "And that's Mrs. King's bedroom," she said about the second. Beyond was a large casual living room looking out upon the end of a swimming pool and beach house and beyond, a low structure that Sally said was a guest cottage.

On the other side of the atrium was a formal dining room looking out upon green lawn and trees. The next closed door was Miss King's bedroom, and the open door beyond exposed the neat order of Jessica's room.

"She doesn't have a room in the employees' quarters?" Johnson asked.

"No, sir," Sally said, her blue eyes round as if surprised at the notion that Jessica was an employee.

The front hallway had only the entranceway through which Johnson had passed and the space beside it, which provided room for the guard who had frisked him and perhaps other equipment and personnel to monitor the grounds and the interior of the building. At the opposite end, past all the closed doors and the living room again, stairs had been carved from the rock of the mountainside. Down those stairs was a painted cement corridor, and another a few steps beyond, apparently matching the hallways on the floor above.

Cut into the rock was a big kitchen and a large communal dining hall. The space under the atrium was unused, but small rooms lined each of the corridors. Johnson counted ten on each side.

His room was under Mr. King's, Sally said. In addition to the other facilities, it had an elevator that opened into Mr. King's bedroom. The elevator was small, a close fit for two people; the control panel had four buttons on it.

"There's another floor below this," Sally said. "It holds service equipment, supplies—enough food for months—rooms for the guards, and the arsenal."

"The arsenal?" Johnson repeated.

She nodded as if every house she had worked in had an arsenal.

"And the floor below that?" Johnson asked.

"There isn't any," she said.

Johnson did not ask about the purpose of the fourth button on the panel.

"Thanks," Johnson said.

"If you need anything else," she said, smiling prettily, "my room is just down the hall. Number six." As she turned away, she looked back at him as if to discover if he understood. He smiled to show that he did.

His room was not much larger than the room at the old hotel in which he had awakened, but it was cleaner. His suitcase had already been delivered and unpacked, perhaps by the delicate white hands of Sally herself, but new clothing had been hung in the closet as if to sug-

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gest that he should put on the gray slacks, white shirt, and navy blazer.

The bathroom was small but serviceable. A woman apparently had occupied the room just before him, for the cabinet behind the bathroom mirror still held hairspray, shampoo, and makeup items. Johnson did not remove them. He took a shower and changed into the new clothes in the closet. As he finished buttoning the shirt, he turned toward the door. It was open. A young woman was standing in the doorway.

She was not much more than an adolescent, but she had the mature figure of a woman. She was dark-haired and dark-browed, and she leaned against the door frame, ducking her head and looking up at him through her luxuriant eyelashes. She pressed her body toward him as if to make available the curves she had recently acquired.

"Hi," she said in an imitation of a sultry voice. "I'm Angel."

"You must be Miss King," Johnson said. "I'm—"

"I know who you are," she said, pouting, as if sulking because Johnson had recognized her. "You're Daddy's new assistant. I can tell you what happened to the last one."

"No thanks," Johnson said.

"It's really tough," she said in her child's voice, "trying to compete with all the free stuff that's floating around here."

"I don't think I understand," Johnson said.

"Oh, you understand, all right," Angel said, her eyes studying him insolently.

"Angel!" a sharp voice called from the corridor.

Angel turned toward the voice with irritating slowness.

"You know your father doesn't like you to come down to the employees' levels," the voice said.

"Daddy doesn't care what I do," Angel said. "You're the only one who cares. And you aren't my mother." But she slouched away, her pose as an enchantress broken now and then by the unconscious bounce of youth.

"Thank God for that!" the voice said. As Johnson moved toward the doorway, the owner of the voice came into view in the corridor. She was a woman of natural blondness and fair-skinned beauty who would have been stunningly attractive if her mouth had not been pinched with the apparent effort to keep her temper in check. "You're the new assistant, aren't you?" she asked, smiling and changing her appearance and even the lines of her slender body at the same time.

"Bill Johnson," he said.

"I'm Evangeline. Mrs. King. Please call me Evangeline."

"I've been instructed to call you Mrs. King."

"By Jessica, no doubt. Well, you can call me Mrs. King when Jessica is around but Evangeline when we're alone. And I hope we will be alone often." She smiled again. It was a friendly smile with just a touch of sensuality.

Angel passed going in the other direction. "You see what I mean?" she said viciously.

Evangeline's mouth pinched again. "I have to apologize for Angel. She thinks any new man—"

But Johnson did not discover what Angel thought about new men, because

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just then a buzzer sounded above the bed. As he turned toward it, Evangeline said, "That's the summons of the master. You'll get used to it. I'll show you the way." She opened the door of the elevator and stood so close to the entrance that he had to brush against her as he entered. "I'd better not go up with you," she said. "Just press the top button."

He pressed the top button. The closing door shut off his view of the beautiful woman who was not Angel's mother but the present Mrs. King, whatever number that was.

When the elevator door opened in front of Johnson, it revealed a bedroom as big as a small house. Its spaciousness dwarfed even the carved walnut custom-made bed against the far wall. The west wall was glass. Open drapes revealed a large swimming pool filled with blue water and surrounded by smooth paving. The pool was set about with chairs and tables and colorful umbrellas. Beyond the white paving was close-cropped green grass. Reflections from the pool rippled across the ceiling of the room.

The carpet was a soft beige deep pile. On it was an assortment of upholstered chairs and sofas along with lamps and tables, a small desk, and a bar with a liberally stocked cabinet behind it. Arthur King stood at the bar in shiny yellow swimming trunks and an open terrycloth jacket. His body and face were lean and tanned and youthful, and his white hair made them seem even more spectacularly young and vital. He turned from fixing himself a drink as the elevator door opened.

"You're Bill Johnson," he said warmly, striding forward and extending his right hand. "I hope we're going to be friends."

King's hand was warm and dry and strong. "I certainly hope so, Mr. King. I don't remember having any friends."

"Please," King said and smiled. "All my friends call me 'Art.' "

"I couldn't do that."

King released Johnson's hand and turned to the bar. The smile slipped unnoticed from his face, like the refrigerator light that goes out when the door is closed. "Don't mind Jessica. She lets the demands of her job overwhelm her humanity. Here," he said, picking up a glass and handing it to Johnson, "you can start by fixing me some scotch on the rocks." As Johnson took the glass and put ice cubes into it and then began pouring scotch over them, King went on. "What's this about your memory? Obviously you didn't forget how to talk or eat or how to do things like fixing a drink."

Johnson held out the glass to King. "Just personal matters. As if I had made a turn into another reality where my memories of who I was or what I have done don't belong. Or as if I was reborn into another world, full grown but without any memories of how I got here."

"Has it happened before?"

Johnson smiled. "I don't remember. But there is some evidence that it has."

"Then it might happen again."

Johnson nodded. "If it does, I hope you will be patient with me."

"Have you tried to retrace your past?"

Johnson shook his head. "It isn't as if I have fugitive memories waiting to be restimulated. I have no memories at

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all. Meeting people I had known before would be like meeting strangers. I have the feeling that I might as well build a new life."

King sat down on the edge of the desk and raised his glass as if to toast Johnson's unusual condition. "So. It's just like starting with a blank slate. You can write anything you want." Johnson nodded. "I like that," King said. His face seemed almost wistful. "Sometimes I wish I could do it." Then his face firmed into its customary appearance of resolution, and he looked like the richest man in the world again. "But not for long." He took a long sip from his glass.

"I wouldn't think so," Johnson said. "You're doing something important."

King looked up a bit too quickly. "What's that? Oh, you mean putting people back to work."

"And everybody is grateful."

King shook his head. "They'll soon forget. Gratitude is the emotion of the hour; love is for the day. Hatred lasts all life long." He looked appraisingly at Johnson. "But if anyone has the means to help these days, he ought to do it."

"Not everybody feels that way."

"They should," King said. "They should. Anyway, it's only a beginning. After we get to know each other better, maybe I'll tell you the rest of it. It's hard to find somebody to talk to, you know. Almost everybody wants something from you or wants you to do something."

The door to the hallway opened and Angel entered the room. She was wearing a white bathing suit with lace around the top and bottom, and she carried a white terrycloth robe. She walked like a little girl now and spoke in a little girl's voice. "Hello, Daddy. Ready for our swim?"

"Is it that time already? Angel, this is Bill Johnson."

Angel smiled at Johnson coquettishly. "We've already met."

"I'll bet you have," King said. He spoke to Johnson as if Angel weren't present. "My daughter is like many girls deprived of their fathers by divorce or death or the demands of a career."

"Daddy!" Angel said.

King went on. "She wants the attention of every man she meets, and she's willing to do anything to get it. Anything."

"Daddy!" Angel said, close to tears.

"My friends and associates know this," King said, reaching out to pull his daughter close to him, "and give her the attention she craves without making her pay the price."

Johnson nodded as if to acknowledge the words without necessarily agreeing with them.

The door into the next bedroom opened, and Evangeline stood in the doorway looking coolly beautiful in a pale green summer dress.

"My wife," King said, "on the other hand, knows that she is the center of attention wherever she goes, but she likes the affect she has on men and the affect their attentions have on me. And she likes to prove to Angel that beside her mature charms Angel's adolescent whoring doesn't stand a chance."

"Oh, Daddy!" Angel said despairingly, but she hugged her father tightly around the waist.

King turned. "Come on, Angel," he

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said with rough affection, and slapped her on the bottom as he turned toward the patio door. "Let's have our swim."

Evangeline looked after them with a trace of a smile on her beautiful lips. "Welcome to our happy family, Mr. Johnson," she said.

The next few days settled into a routine in which Johnson was slipped into the King family life like a precision-ground gear, meshing smoothly with everyone else, making the whole machine work. Angel and Evangeline attempted to recruit him, each in her own way, in the no-holds-barred battle for King's favor. But Johnson indicated that he not only was neutral but, as far as they were concerned, neuter as well. King seemed to enjoy the competition, as if it were a game he played to take his mind off a more important competition elsewhere, and he even incited them to greater efforts. With Johnson, on the other hand, he was always charismatic, as if Johnson's opinion mattered because he had no involvements.

With Jessica, King behaved differently. When he spoke to her he used short, brisk sentences without emotion, as if this were the businessman who had accumulated a monumental fortune. Every morning after an early swim and breakfast reading newspapers beside the pool, he spent a couple of hours in the study with Jessica. Johnson was never present, but occasionally he would see them together behind the desk, studying the computer, participating in a televised conference, or discussing weighty matters in hushed voices.

King would emerge from the study looking grim to eat lunch with his daughter or his wife, sometimes both. Frequently he would ask Johnson to join them and Johnson would be a spectator at the baiting that constituted their principle mode of intercourse. In the afternoon King read a mystery novel or spy thriller, swam for half an hour, napped in the big bed, rising refreshed for several scotches in the living room before dinner, bantering with his wife and daughter, chatting with Johnson, and eating dinner formally in the big dining room with his family and Jessica. Johnson was not invited to join them for dinner, but afterwards King watched a film in the study, where a panel rolled down to expose a screen and a panel opened to expose a projector, with whoever wanted to watch, including Johnson. He was in bed by eleven.

Twice the routine was disturbed by the arrival of a young man, a different one each time, who was admitted in the late afternoon and spent more than an hour in the study with King and Jessica. One of them hurried away immediately afterward, but the other stayed for the social hour and dinner.

King introduced him as Doug France.

"And this," Doug said, raising his glass to King, "is the next President of the United States."

"That's enough!" Jessica said in her most peremptory tone of command.

King grinned. "Now, Doug, you know I'm going to turn it down." He looked boyishly modest and at the same time a man of wisdom and mature judgment.

"All the same," Doug said stubbornly, "you're what this country needs—and the world, too."

Johnson turned to King. "Are you

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thinking of running for President, Mr. King?''

''That's none of your business!'' Jessica snapped.

''Now, Jessica,'' King said. ''Bill is one of the family.''

''You must not have been watching television,'' Evangeline said lightly. ''It's been on all the news. Both party conventions are coming up in the next couple of weeks, and party leaders on both sides have talked of nominating Art as their candidate.''

King laughed. He seemed to be enjoying the discussion. ''That's because I've been smart enough never to become involved in politics, and when I've made contributions to candidates I've always given equal amounts to each side.''

''Gee, Daddy,'' Angel said, ''would you be the first candidate ever nominated by both parties?''

''Eisenhower might have had it if he hadn't identified himself as a Republican before the conventions,'' King said. ''But he was a war hero.''

''It's better to be a peace hero, darling,'' Evangeline said.

''No man is a hero to his valet,'' King said ironically, smiling at Johnson. ''Nor to his wife,'' he added, looking at Evangeline. ''Or to his daughter,'' he continued, turning his gaze toward Angel.

Each of them looked injured but unwilling to admit it by protesting their admiration for King, as if by restraining their natural impulses they could deny his power to hurt them.

''In any case,'' King went on, looking at Doug, ''it's all academic. Politics is not for me. Campaigning, making promises, concessions, compromises . . .''

''To the good old days!'' Doug said, raising his glass again.

''What days were those?'' Johnson asked.

''You know—when things were done properly—'' Doug began.

''Shut up, Doug!'' Jessica said.

''Bill doesn't remember the good old days,'' King said. ''Nor any old days, for that matter. That is his charm.''

For once Johnson was invited to join the family for dinner, perhaps to make up, with Doug, an even table. The conversation was a strange mixture of overtones and undertones, with political talk mingling with King's customary teasing of his wife and daughter. King's cruelty to them contrasted oddly with his kindness to Johnson and his careful directness with Jessica. Doug he treated as a subordinate to be ordered about. The political discussons, on the other hand, though they seemed to be about other candidates, appeared to carry innuendos that Johnson was not supposed to understand.

At one point when the others were engrossed in a conversation of their own, Evangeline, seated next to him, leaned over and said softly, ''Art really would like to be president, you know.''

''Why?''

She looked at her husband at the far end of the table, with a mixture of pride, love, and bewilderment. ''He has so much to give, so many things this world needs—leadership, direction—'' Her voice trailed off.

''What direction?''

''I don't know,'' she said. ''He

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doesn't talk about such things with me."

"Darling," King said lightly from the other end of the table, "there's no use your trying to seduce Bill. He's already proved himself impervious to your charms."

Evangeline looked pained and her jaw tightened as if she were holding in a reply.

"Anyway," King continued, "think how damaging it would be to your self esteem to make love to a man who doesn't remember you afterward." He chuckled, and the others joined in the laughter as if to deny the cruel edge to his remarks.

Afterwards, with the others gone, King turned to Johnson in the bedroom as Johnson was pulling the drapes to shut out the night. "The world's in a sorry mess," he said, clinking ice cubes in his glass.

"Yes, sir," Johnson replied. "I guess there's a lot of things wrong."

"It's not just the economy," King went on, almost as if he were talking to himself. "That's just one of the symptoms. It's politics, cynicism, loss of faith, confusion of values. 'Things fall apart,' " he quoted.

" 'The center cannot hold,' " Johnson continued.

"You remember that?" King asked.

"I've been doing some reading in my room," Johnson said. "I've borrowed a few books from your library. I hope you don't mind."

King waved his hand as if he had already forgotten. "There are times when the world is served best by weak government that allows natural leaders to build and develop, the economy to grow, the people to prosper. But there are times when strong leadership is crucial. When competing theories of history try to guide the world into the future along one channel or another."

"But what can we do?"

"We need a leader who is willing to meet force with greater force, to call people to the service of something greater than themselves, to be firm, strong, confident, bold. And all we have is little men without vision or purpose,' seeking little advantages for themselves or their constituents while they let the great issues pass them by without blinking."

"What about you, sir?" Johnson asked.

King shrugged. "What can one man do?"

"But you have a chance to be nominated. To be president. Surely as president you could put your philosophy into action."

King looked speculatively into the glass of scotch and ice cubes he held in his hand. "Do you realize how difficult it is to move the great hulk of government? Congress? The entrenched bureaucracies? The courts? One man doesn't have a chance to put anything into action. It's all he can do to move the behemoth an inch or two one way or another."

"Surely there are ways," Johnson said, "to cut through the red tape? Go around the behemoth?"

King glanced at Johnson. "Can you keep a secret?"

Johnson smiled. "That's what I'm best at."

"Yes, of course," King said, looking into the depths of his glass again as if

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it were a crystal ball. "There is a way. It would involve a radical change in our way of government at least for the duration of the crisis. A temporary delegation of authority to the executive. A temporary limitation on the authority of the courts."

Johnson looked thoughtfully at King. "Wouldn't that be dangerous?"

"Yes," King agreed. He leaned back against the desk. "But not to act is dangerous, too. Maybe more dangerous. You have to trust the executive. His ability to operate the government like a well run business. From the top. Making decisions. Delegating authority. Seeing his orders carried out or replacing the foolish and incompetent with those who will carry them out. There's precedent, you know. That's what we do in wartime. And we are in a kind of war. Maybe a condition more urgent than war."

"What if it didn't work?" Johnson asked. "What if he failed?"

"Would we be any worse off? But he wouldn't fail. Not if he's the right kind of person. Who knows what has to be done and how to do it." King's face was animated; his voice was excited.

"And what if he succeeded," Johnson said, "but saw another problem ahead and another that needed his unusual abilities and his extraordinary powers? Would he want to give up his control of things? Just when events were moving in the right direction? Would we ever get democracy again?"

Their voices seemed hushed in the big, soft room.

"You've got to have confidence in your leaders," King said. "George Washington could have been king; he refused even the trappings. Anyway, democracy doesn't exist in institutions but in people. As long as people believe in democracy it will continue. The danger is in their loss of faith. If it proves inadequate . . ." His voice trailed off into silence. "But that's all hypothetical," he said finally.

"You're turning down the nomination tomorrow?"

King smiled slyly. "You'll have to wait and see. Like everyone else. Just because you're my personal assistant —I'm only teasing, Bill. I like you. You're easy to talk to. I bet people tell you things."

"I guess they do."

"Like talking to a priest," King muttered. He studied Johnson's face. "Because you don't talk, and chances are you're going to forget."

" 'And what rough beast, its hour come round at last,' " Johnson said, " 'slouches toward Bethlehem to be born?' "

"You remember that, eh?"

"Yes, sir. Will there be anything else?"

"Not tonight," King said wearily. He looked tired. " 'What rough beast,' " he muttered, and turned his hands palm upward and studied them as if he expected to find stigmata.

The library was crowded with people and television equipment. All the furniture had been removed from the room except the big desk and the chair behind it. The door to the hall stood open and the door into King's bedroom. People kept coming and going through the doorway into the hall, but nobody en-

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tered the bedroom where King and Jessica remained in conference.

One of the members of the television crew was Robert Scott, his stony face rigid above the gray collar of the King International uniform. He was tinkering with the control panel when he looked up and saw Johnson. Johnson was walking toward Scott when King appeared in the bedroom door and said, "Bill, why don't you get these men some beer and soft drinks. This is hot work."

"Yes, sir," Johnson said, and members of the crew murmured their appreciation for King's thoughtfulness.

Johnson motioned Scott to follow him as he passed. He led the way down the hallway to the stairs and down the stairs to the kitchen. He relayed the order for drinks to the kitchen crew and then walked quickly down the corridor to his room. As he entered he motioned to Scott for silence, walked to the elevator, opened the door, and gestured to Scott to join him. Scott's normally impassive features were curious, but he slipped in beside Johnson. Johnson pushed the bottom button.

The ride was long. Finally the car stopped and the door opened. In front of them was a large, concrete room. At the far end was a corridor with doors opening off it on either side. The place had the feel of a bunker far below ground, but it had been maintained. The paved floor was not dusty. Air whispered through ceiling ducts. Automatic rifles racked against the wall were clean. Machine guns and mortars in rows upon the floor gleamed with oil. Boxes of ammunition and grenades were stacked neatly against the walls.

"This is a god-damned arsenal!" Scott exclaimed.

"Only part of it," Johnson said. "The small arms are on the floor above. But that's not why I brought you here."

"What are you doing here?" Scott asked, stepping out of the elevator, half-distracted by the sight of all the weapons.

"That's not important either. But I got a job as personal assistant to King, just as you got a job with his communications section."

"But you're in a perfect position to— How did you know that?"

"About your job? Isn't it obvious?" Their voices echoed off the hard walls.

"I guess. We've got to talk."

"Talk fast. There are no cameras or bugs here. But our absence mustn't be noticed."

"You know what King is up to, don't you?"

"The Presidency?"

"His name will be put in nomination at the upcoming Republican convention. It he doesn't get that he'll be nominated by the Democrats." He couldn't seem to get his eyes off the blue metal.

"Or both."

"Both?" Scott looked quickly at Johnson. "Yes, of course. Why didn't I think of that? He's got to be stopped."

"Why?" Johnson asked simply.

"People already are calling him King Arthur," Scott said. "He's got all the economic power. What if he had the political power, too?"

"Maybe he'd be a good president."

"What are his plans? What are his principles? What does he stand for?"

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"Putting everybody back to work? Ending the Depression?"

"Building a political base? Becoming unbeatably popular?"

"But if he were—as you put it—stopped, wouldn't that end the recovery? Throw millions out of work again? Turn joy and hope into misery and despair?"

"What good are jobs if you lose your freedom?" Scott asked.

"What good is freedom without a job?"

"The old free-enterprise-Marxist dilemma." Scott looked straight at Johnson. "I don't know what the future holds, but I do know this: King isn't what he seems. He's rising to power as a man of vision, a philanthropist who cares more about his fellow man than mere worldly possessions, a kindly man who is at the same time a superb executive—exactly what anyone would want for a president. But look at this!" Scott waved his hand at the weapons and the boxes. "That's not what a philanthropist keeps in his cellar. Those are the possessions of a man who believes in force."

"Or defense," Johnson said. "You can't fault a man who strives for the best but prepares for the worst."

"Mussolini made the Italian trains run on time and Hitler brought Germany out of the Depression. And they took us into a war that destroyed millions of people."

"Some times it is better to suffer a little evil now to avoid a greater evil later on."

"What about doing a little evil now to avoid a greater evil later on?"

"That never works. You can't know you're going to avoid the greater evil. You can only do good by doing good."

"What if someone had shot Mussolini in 1922 or Hitler in 1933?"

"You're the political scientist. Wouldn't conditions have produced someone else? Maybe somebody worse after the drama of the assassination?"

"Who can know these things?" Scott asked. Johnson sighed, but Scott went on. "King is the man of the hour. I don't think anybody can replace him."

"What are you going to do?"

Scott patted his waistband under his uniform jacket.

"How did you get it in here past the guards and the metal detectors?" Johnson asked.

"I hid it in the control panel," Scott said, "and in all the confusion nobody searched too hard."

"You mustn't do it. Nothing good will come of it."

"How do you know?"

"I know." Johnson said it with complete confidence.

Scott brushed it aside. "If you can't help, just stay out of my way. And if I fail maybe you'll have a better chance."

"What if I told you he's going to ask people to not nominate him?"

Scott looked at Johnson stunned. "Is that what he's going to do? My God! Why didn't I think of that? Just like Caesar, but Caesar turned down the crown three times. Once for King will be enough. They'll make him take it. This is all carefully planned, but all it takes is one well-placed bullet."

"There's a better way," Johnson said urgently.

"What?"

"There's always a better way."

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"Oh."

"The only way King can truly be stopped," Johnson said, "is if he stops himself. He must have a chance to reveal his true nature."

"How could we do that?"

"You," Johnson said. "You must do it. Haven't there been occasions when people exposed more of themselves than they intended?" He stepped back into the elevator. Scott squeezed in beside him. Johnson pressed the second button from the top. "You'll think of something," he said.

He led the way out through his room and down the hallway to the stairs leading to the first floor. Scott stopped suddenly and felt his waist. He started trotting after Johnson. "My—" he started. "You've—"

Johnson called back over his shoulder. "You'll think of something."

King entered the room wearing a dark-gray business suit, a pale blue shirt, and a dark-blue tie. It looked a bit like the King International uniform but expensive. His face was bronze under his neatly combed white hair. "Good morning, boys," he called to the television crew. He went behind the big desk and talked to Jessica in a low voice, gesturing occasionally at the cameras.

"Are you going to make an announcement, Mr. King?" one of the cameramen asked.

King glanced up and smiled before going back to his low conversation. From his position in the doorway into King's bedroom, Johnson saw Scott move from the control panel as if in sudden decision, go to one of the cameras, and begin checking it.

King concluded his conversation with Jessica and turned to the cameras. He blinked into the lights. "All right, gentlemen. Are you ready?"

The director, a large, middle-aged man with an earphone and pencil microphone clamped to his head, said, "All ready, Mr. King."

"This is live, right?" King said.

"Yes, sir. When I give you the signal, the red light will come on under the camera we are using. It will be eleven A.M. here, two o'clock in New York where the networks will be taping for their evening news. But at least two of them are breaking into their regular programs to carry your statement live. How long will you be speaking, Mr. King?"

"Just five minutes."

Members of the crew glanced at each other as if questioning the trouble of setting up all this equipment for a five-minute speech.

"You'll be sitting at your desk, right, Mr. King?" the director asked.

"I'll start seated and then get up, move to the front of the desk, and sit on the front edge, informally."

"Got that, boys?" the director asked the cameramen. "We'll have the middle camera head on, the others cheated right and left. Just watch the red light, and—"

"I know all that," King said impatiently.

"Yes, sir. It is now ten fifty-nine, if you want to get ready. I'll count down as we get to fifteen seconds."

King sat down behind the desk and composed his face. He looked serious, concerned, sympathetic. It was the face on the billboards.

"Fifteen seconds," the director said.

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"Ten. Nine. Eight. Seven. Six. Five. Four. Three. And you're on, Mr. King."

King looked into the center camera. "Hello, friends," he said. "I'm Arthur King and I'm speaking to you today from my home near Los Angeles." He stood up and moved around the desk toward the front. He did it with the ease of an experienced actor, but it looked effortless and unstudied. "In a misguided effort to provide leadership in these troubled times, a few people have put my name forward as a possible candidate for President of the United States. I want you to know that I am not a candidate."

Scott looked up from the control panel toward Johnson.

"I am not a political person," King went on, "in spite of the fact that my business activities often involve me in concerns and decisions that not only deal with the political process but often involve the same kind of give-and-take as legislation and the effective use of resources that is involved in administration."

He leaned back against the edge of the desk and smiled modestly. "I am an industrialist, though I was born of working parents. I have worked all my life. I have also been blessed by good fortune. No one gets to the position I hold on merit alone. Now, through the worldwide branches of the enterprises I head, I find myself negotiating with prime ministers and heads of state of all kinds, the way I used to deal with supervisors and shop foremen and grocery clerks. And—" he leaned forward confidentially toward the camera and smiled—"I can tell you it isn't much different."

He allowed himself a self-deprecating chuckle.

"I am neither a Republican nor a Democrat. I have held no political office, and I want none. I have quite enough to do managing the businesses for which I am responsible—and seeing that our new employees, who now number more than ten million, are usefully occupied and paid on time."

King smiled benignly.

"I will not be so vain nor so insensible to the opinions of others as to say, as General Sherman once said, 'If nominated I will not run; if elected I will not serve.' I do not expect to be nominated by either party, and I urge those who are mentioning my name not to do so, to turn to others who are better qualified by position and temperament and experience."

He rested himself on the top of the desk and crossed his ankles.

"I suppose there are conditions under which I would respond to a genuine draft, but they are so unlikely that even mentioning them would be tantamount to doing a Sherman. I allude to this only to let you all know that I do not place myself above the office or the needs of this nation or the world. It is simply that I cannot imagine—or imagine anyone believing for a moment—that I am the only person who can do what needs to be done."

He stared into the camera lens sincerely for a long moment and then said, "Thank you, and may God be with you."

He held his gaze on the lens until the red light went out, and then turned to Jessica who moved toward him with a quick, triumphant skip. His face changed

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to an expression almost sly, and he said, "If they believe that, they'd believe anything."

It was said as a mutter to be heard only by Jessica, but the words seemed to boom out. They were followed by an awful moment of silence. Everyone looked at each other.

"But the red light went out!" King said.

The director's face had turned pale. "It must have malfunctioned."

"The camera was still on," Scott said.

"You mean that went out on the air?" King asked as if in pain.

"I'm afraid so," the director said. "Just a minute. I'll check."

"Never mind," King said. His face had become set and gray under its tan. He turned and went toward his bedroom door. His walk was unsteady as if he were drunk or had aged twenty years. Jessica trotted after him, attempting to clutch his arm, but he brushed her hand away and stopped her from following him.

Johnson had moved from the doorway to the bar and quickly fixed King a drink. As he handed him the glass, the one-time man of the hour said to himself, "Gone. All gone. All in a second." He drained the glass in one long swallow.

Evangeline came through the doorway and stopped beside King. Her face was compassionate and loving in a way it had not been before. King's arm came out and brought her close to him in an unconscious gesture of need. "Vangy," he said. "Thank God you're here."

Then he saw his daughter standing in front of him, and he reached out with his other arm and hugged her close as well. "Angel," he said huskily. "We've got to get to know each other, we three."

"May the future be kind," Johnson said.

Johnson looked around his small room as if searching for something. Then he shook his head and went into the bathroom. Finally he opened the mirrored medicine cabinet door. On a shelf with hairspray, shampoo, eye shadow, and other cosmetics was a small, cylindrical metal case. Johnson removed the cap and screwed the base until a red, waxy material protruded from the top. He closed the cabinet door and began to write upon the mirror in small, precise letters.

"Your name is Bill Johnson," he wrote. "You have just stopped a man from becoming a dictator and ending a great experiment in democracy, and you don't remember. You may find the newspapers filled with reports of what happened, but you will find no mention of the part you played.

"For this there are several possible explanations. . . ."

After he had finished, he tossed the container into the wastebasket, turned off the light, and went to his bed. He lay down with his hands behind his head, staring up at the ceiling, and waited for the night. ■

● Minimum System Reliability: It worked once.

Kelvin Throop III, *The Management Dictionary*

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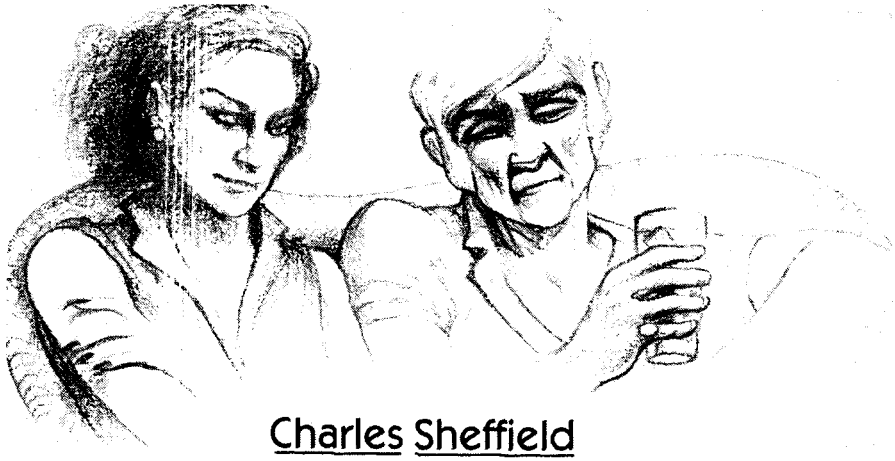
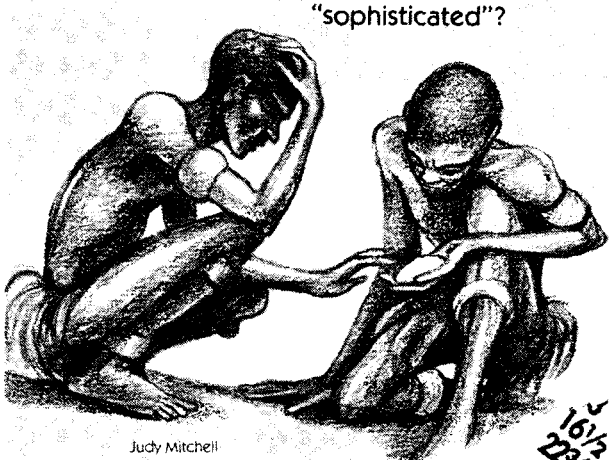


Charles Sheffield

NINE DAYS' WONDER

Are you *sure*
you know
the difference between
"primitive"
and
"sophisticated"?



Judy Mitchell

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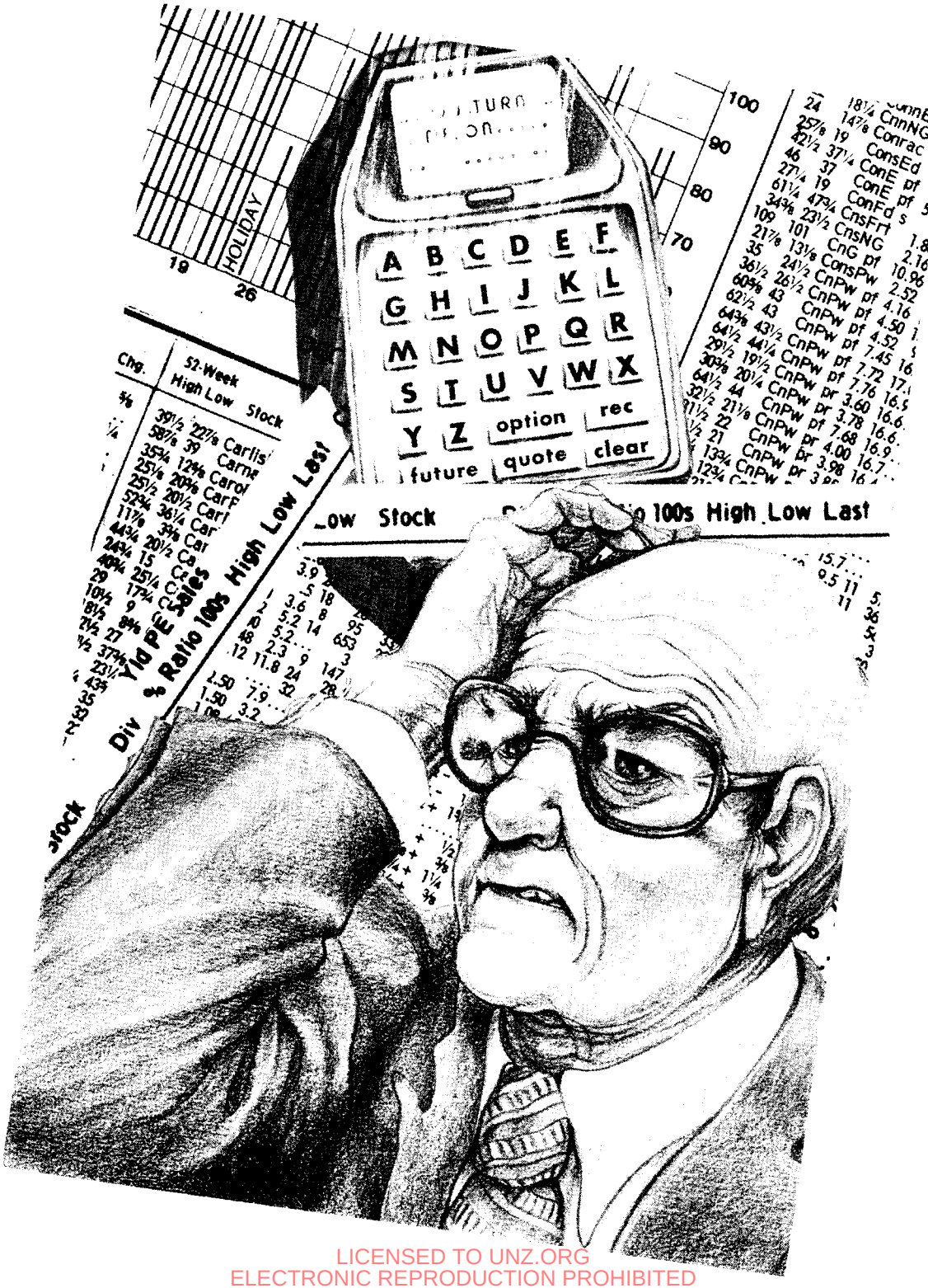

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TOUCH ME, said the pink panel on the front of the little gray box.

It was sitting in the In Tray when he entered the office, and Merle Walters glared at it while he limped to the coat rack, struggled out of his overcoat and took off his battered hat. He was wearing a shiny blue suit, its empty left sleeve neatly pinned to the old-fashioned jacket.

He went to the desk, picked the box up and looked at it closely. There was an array of number and letter keys on the lower part, but no other instructions. After a moment he leaned forward and jabbed at the panel with his index finger.

The tiny screen glowed to a phosphor-green life. YOU TURN ME ON, the message scrolled up. WOULD YOU LIKE TO PLAY? HANDLE ME RIGHT AND I'LL TELL YOU WHAT YOU WANT TO KNOW.

He grunted, put the box down, and shouted out through the open door.

"Franny!"

"Yes, Mr. Walters?" The secretary looked in, blond eyebrows raised.

"I wondered what you were smirking at when I came in here. What the hell is *this* doing in my office?"

"Mr. Suomi left it for you. He said you'd know what it is."

"Damn right I know what it is. It's that dumb gadget he showed me the poop sheet on the other day. Thirty thousand dollars worth of fakery. I hope he's not thinking of *buying* one?"

"I don't know, Mr. Walters."

She looked at him calmly, while he glowered at her. His bald head was wrinkled with perplexity. Tolly Suomi was as tight with a dollar as anyone in the company. He wouldn't fork out thirty thousand for a gimmick that couldn't possibly work. Finally Walters grunted.

"Oh, all right. Thanks, Franny. I'll have this out with Tolly myself."

As she left he again reached out his right arm, picked up the gray box, and examined it more closely. It was about two inches across and four long, and less than half an inch deep. He touched the pink panel again, and the scrolling message continued. The terminal cuteness of the initial message suddenly gave way to a far more businesslike style. "*AVANT SYSTEMS—BEYOND THE MICRO. Any attempt to open the case of this equipment, or to expose it to exploratory radiation, will render it useless and nullify all warranties. In the event of malfunction, return unit to the manufacturer. Ambient temperatures must be in the range −20 to +50 Celsius. Do not operate this equipment close to strong electric or magnetic fields, or near microwave sources. Press bottom key for data input and general instructions.*"

Merle Walters was still staring at the message when Tolly Suomi walked into the office and sat down uninvited in the old visitors' chair. Merle registered his presence by a loud sniff and went on peering at the box.

"Know how to use it?" Suomi was as neat as Merle was sloppy. His beard was trimmed to the last hair, and his charcoal-grey suit looked newly pressed.

"I know we've had a good year." Merle seemed to ignore the question, and spoke without looking up. "That doesn't mean we can throw money away. Didn't you see my notes for this thing?"

"Sure I did." Suomi's face was im-

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passive, but there was a tiny glint of pleasure in his eyes. "You think I paid for that? I didn't. Remember the Zaire receivable that I wanted to wipe off the books last year as uncollectable, and forget about?"

"You know I remember. What about it?"

"Remember who persuaded me to arrange it as part of a swap of assets with Lectron Corporation, so we'd finish with a twenty percent interest in Cybercon?"

"Get on with it. You didn't take much persuading."

Tolly Suomi leaned forward and took the Avant Systems' module from Merle's hand. "Your idea came home to roost. We're part-owners of Cybercon now, so last month I went to see Lawson there to talk about joint investment programs. Want to know how they decide *their* investments?"

"I'm afraid to ask." Merle watched as Suomi pressed the lowest key on the face of the box. "Are you telling me we bought into an outfit that uses black magic to decide where to put their money? I ought to have my head examined."

"Maybe. Wait and see." Suomi handed Walters the day's copy of the *Wall Street Journal*. "Lawson got the box four months ago. He didn't believe it could work, but out of curiosity he started to play with it—just paper investment. Now he says his success rate on tracking the Market is over ninety percent. It used to be down about fifty. Do you want to know how well he did yesterday? You can find out easily from the paper."

"Tolly, I read the blurb on this thing. Before it could work it would need programs and circuits that could predict the whole blasted market. That's ten times as hard as Grand Master chess, and it's packed in something the size of the smallest micro."

"Not the whole market. It only handles Over-the-Counter stocks."

Merle Walters peered at him over the top of his glasses. "That's *harder*. Small companies have more variability than IBM or General Motors. Damn it, Tolly, don't say you take this thing seriously."

Suomi smiled. " 'It is a capital mistake to theorize before one has data.' How many times have you quoted that to me? I have data. You don't. For the past week I've had Jack Tukey out at Cybercon's offices, using this Avant Systems' gadget. He'll give you the details, but I can give you the bottom line: it works."

"How the blazes can it?"

"If you mean *why*, I don't know. But *how* couldn't be easier. You enter the code of a stock you're interested in, then the number of shares and whether you want to buy or sell. It computes for a while—and some cases can take as long as twelve hours before the calculation is done—then it gives you a buy, sell, or 'no action' recommendation."

Walters reached out and took the box from Suomi's hand. "Maybe I'm more out of touch than I realized. I ought to call Charlie Kirkwood and ask him if a thing like this is state-of-the-art now. Mass storage gets cheaper all the time."

Suomi shook his head. "Kirkwood agrees with you. I asked him. No way, he said, not with any technology he's familiar with. Market prediction models

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exist, and he thinks some of them are pretty good—but they need a big mainframe computer to get near their storage and speed needs."

Walters leaned back in his chair. He sighed. "All right. You've already done your homework, and you think it's as fishy as I do. So what do you want *me* to do? Damn it, Tolly, I'm old and I'm retired. We have half a dozen people here at WAWD who could look at this and see what's really going on. Why not use one of them?"

Suomi hesitated, looking at the older man questioningly. "Seriously? Merle, I know you've been sick. If you don't feel up to it I'll talk to Vince and we'll find somebody else."

That earned him a pleased sniff and another sly look over the top of the tortoiseshell glasses.

"Just you try it, laddie." Merle Walters said. He pressed the pink panel at the top of the case, and YOU TURN ME ON again appeared. "I wonder what halfwit thought this was a clever way to prompt the user? Let's get Jack Tukey in here so I can hear the rest of the story."

The preconceived mental image offered by the name on the office door went away in the first few seconds. Wilfred Wilbur Lawson III sounded like the name of some old stick-in-the-mud, a man who would pay 30,000 dollars for a piece of junk and then be naive enough to believe it would work. Fred Lawson, President of Cybercon, couldn't have been a worse match for that image. Merle Walters found he was facing an untidy man in his late twenties, with a thick mop of black hair and an alert pair of eyes that scanned him briefly from head to foot.

"Very pleased to see you, Mr. Walters." Lawson put down his plastic coffee cup. "Bit surprised, too. You know, Lectron had shares in us for three years, and in all that time we never saw their management—only their auditors. I'm glad WAWD Industries has more interest."

Fred Lawson hadn't been in his office, and Merle got the impression he spent little time there. He had been in the lab, and seemed to feel it quite natural that they should meet there. Merle looked around him carefully. The place was messy, but all the equipment was clean, neatly arranged, and well cared for. And the security before Merle was allowed in had been tight.

Fred Lawson didn't seem the type for long social preliminaries. Merle sat down on a metal stool and pulled the Avant Systems' instrument from his briefcase.

"We're interested in you, all right. You're just the hi-tech sort of group we like to have as part of WAWD. Alex Burns tells me you have things going in water-gun technology like nothing he's ever seen."

Lawson nodded. "Want to see some of it?"

"Not now. At the moment, this is the thing that has us puzzled." Merle tapped the gray box gently. "According to Tolly Suomi, and what I've seen, you're a savvy bunch here. What made you decided to lay out 30 K for this bit of magic?"

"The Avant Systems' box?" Lawson looked puzzled. "I thought you guys would have more idea how it works than

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we do. Isn't Charlie Kirkwood a microprocessor specialist? The Avant people won't say how they do it, and I don't blame them."

"So how did they talk you into buying it?"

That was met with a look that made Merle feel uncomfortable. Lawson was regarding him as though doubting his ears. "Look, Mr. Walters, we may not be financial wizards here at Cybercon—if we were, our cash flow would be a damned sight better. But naive as we are, I wouldn't buy a thing like that without a long trial period. In fact, the Avant salesman *insisted* on it. He says it doesn't work for all investment programs, and we ought to be sure that it was right for us before we made a decision. We had a free three-month trial period. Before it was over the Predictor had more than paid for itself."

Merle rubbed thoughtfully at his blunt nose. "Didn't you wonder why Avant had picked Cybercon to make into millionaires? If that gadget worked they were giving you a license to print your own money."

"Just what I said to them. They were pretty direct with me. We're part of a limited test program, to see how good the system is for different investment strategies, and to see if using the system distorts the real market response. If it's as successful as Avant thinks it will be, it will always be very restricted in distribution. No plans for general marketing, ever—just a few heavy investors looking for big profit potential." Lawson shrugged, his open shirt collar riding up over his lab coat. "The way I looked at it, what did we have to lose? I could try the predictions on paper for a month or so, and see how they worked out with theoretical buy-and-sell situations. If it worked, it worked. If not, we'd find out for ourselves, not invest any real money, and not pay Avant Systems."

"Do you know anybody else who's got one? I've not seen any ads for it in the trade papers."

Lawson grinned. "Who'd be dumb enough to buy it? When they came to me I had the same reaction as you—it had to be a con game. But it's not. I'll show you our figures. Who else has one, you say? Dunno. Want me to call the Avant sales guy and ask him? He's pretty friendly. Brewster, his name is, Earl Brewster."

Merle hesitated. Finally he shook his head. "Not yet. Hold off for a day or two. So he just called you, out of the blue?"

"Didn't call. Dropped by the front office. If I hadn't been hanging around waiting for a DCAA auditor I wouldn't have given him two minutes. He's not your idea of the average salesman, I'll tell you that."

"You see him regularly?"

"Every week. He stops by to see how the Nine Day Predictor is doing—that's the time limit for this model—and hear our reactions. He says they've been looking into a Twenty Day model."

Merle sighed and picked up his battered felt hat. "If you had a method of predicting the Stock Market, would *you* sell it?"

"No way." Lawson stood up. "I'd keep it to myself and use it to take over the world." He shook his head. "That was one of my first questions to Brewster. If it works, *why* are you selling it?"

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"He had an answer?"

"Sort of. Avant Systems is owned fifty-fifty by two partners, and they can't agree. One of them says that you need a lot of knowledge of the Market before you can use their Predictor. The other—she's the one who built the Nine Day model—says you don't, anyone can use it. So—" Lawson shrugged "—the idea of an independent field test, with Stock Market idiots like me."

"What happens when the test is over?"

"We keep our model, and Avant updates the data in it free for three years. But there will be no more outside sales of Predictors after the test period is over, four months from now."

Merle Walters held out his hand. "I have to get back downtown. I'd like to see that water gun Alex Burns told me about, the one drilling sheet steel, but I'll have to take a rain check. You fellows impressed Alex, and that's not easy."

"Wait until he sees what we've got in the back office."

Lawson stood with Walters as Merle's briefcase was checked on the way out. Apparently, the fact that Merle was with the president of the company did not allow a visitor to avoid inspection. Lawson ran a tight and impressive operation. Merle was nodding approval as he walked through the car park to his old Buick with its special fittings for a one-armed driver, and drove slowly back to Route 270 and on southeast to Washington.

He was too wrapped up in his own thoughts to notice the small gray van that tagged along from Gaithersburg and followed him discreetly back to town.

* * *

REPORT: Following instructions the instrument was examined as thoroughly as feasible, given constraints on use of x-rays or direct inspection. Some conclusions are tentative because of those limitations.

(1) The instrument weighs 440 grams. This is heavy for its size if the case is of standard thickness and strength for hand-held computers, and contains no more than logic and memory chips and keyboard connections. There may be up to 250 grams of excess weight, of unknown function.

(2) Quality of workmanship of visible parts is very high. We assume this is true also for internal mechanisms, since activation pressure is close to constant for all keys.

(3) There are no significant electromagnetic signals given off when the device is in the COMPUTE mode, over our entire frequency test range.

(4) In view of the general sophistication of the design, the "self-destruct" warning in the instructions almost certainly implies the existence of an ERASE mode. In such a mode, if the outer case is breached a program zeroes out all program and data locations, and all prediction algorithms are lost. Such protection is not difficult to achieve and is impossible to inhibit without full knowledge of the mechanism employed.

(5) Given the present state of development of hardware and software (logic and memory chips and relevant algorithms) no computer model sophisticated enough to permit Stock Market prediction could possibly be housed within the physical space of the Avant Systems' Nine Day Predictor.

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Merle Walters laid down the report. "That last one is the killer. The boys in the West Coast lab don't believe it, either. Look what Preston scribbled on the bottom here: 'What are you trying to do, make us all go mad? My crew are wasting weeks trying to figure out how to cram a market predictor into microchip dimensions.' According to them, it *can't* work."

"It's a bumblebee computer," said Tolly Suomi dreamily. The two men were sitting on a bench looking west across the Potomac. The first hint of fall was in the air, with a touch of red and brown marking the fading green vegetation on the other side of the river.

"Remember the old problem with the bumblebee?" went on Tolly. "His wings are too small for it to be theoretically possible for him to fly. But the bumblebee doesn't know that, so he spreads his wings, and up he goes . . ."

"Most bumblebees are female," said Merle grumpily. His eyes were fixed on the brown surface of the river. It had rained hard two days earlier, and the Potomac was full of red clay sediment from its upper reaches. "I could read between the lines, even without Preston's note. I hope there's no urgent contract deadline out in California, because I'm certain the crew out there are going mad with this thing."

"No local leads?"

"Nothing." Merle tapped the sheet on his knee. "With that much sophistication of technology, you'd think we could find the manufacturing plant as easy as wink. So far we don't have a sniff of it."

Tolly nodded. "You getting the same suspicions I am?"

"I think so." Merle was scowling. "God knows we've speculated enough about this sort of thing for the past few years. We'll have to keep plugging at it. I'm going to ask Fred Lawson to try to arrange a meeting for me with Earl Brewster, the Avant Systems' salesman. We've pussyfooted enough, I'm ready for something more direct."

"Better be careful, Merle. If we're right we could be in over our heads on this one."

"I'll watch it." Walters closed his briefcase and stood up slowly. "I have to go over to Alexandria now—Lawson thinks Duncar Associates there may have a Predictor. See you back in the office about four."

The two men began to make their way eastward to M Street, where Walters left Tolly to walk to the office and flagged a cab. Traffic was heavy. For the first few minutes of the ride Merle was deep in his own thoughts. When he finally realized that they were heading up Canal Road rather than taking Key Bridge, he felt a sharp surge of alarm.

"Hey! I said Alexandria."

The driver turned his head back briefly and nodded. "I heard that, sir. But if you will permit it I want to make a detour along the way."

His voice was mild and his tone polite, and the face that had turned to Merle showed no trace of menace.

"What the hell do you mean, a detour? I have an appointment to keep."

"Yes, sir. We postponed that for you, sir. My name, by the way, is Earl Brewster, and let me assure you at once that you are in no danger."

Merle leaned back against the seat cushions. His pulse was racing danger-

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ously fast for a man who had had two heart attacks. He tried to relax.

"Top man at Avant Systems?" he asked after a few moments.

"Part owner." The voice was full of confidence. "You are very perceptive, sir. My partner is Alicia Rivera, and you will meet her in just a few minutes. We would both like to apologize for the melodramatic touch, but you will soon see that there are reasons why we have to operate in this way."

As the cab made its way smoothly north through the middle of the Georgetown traffic, Merle studied the silvery-white hair at the back of the other man's head. It was carefully shaped in an expensive cut. He thought of Tolly Suomi's words. *If they were in over their heads*—and it looked that way—Merle was going to be the first to find out he couldn't touch bottom.

"How much time have you spent in Africa?"

Apart from the worst (the bottom of the Potomac?) Merle hadn't known what to expect. But certainly not this.

Earl Brewster had driven to a private house on Foxhall Road, standing in its own extensive grounds. An eight-foot-high brick wall provided privacy for the property, enclosing carefully tended lawns and formal flower beds. As they walked through to a sunlit stone patio in the rear, Merle did his own estimate of the value. A million, easily. He filed away another query and brought his mind back to Brewster's question.

"Haven't seen North Africa since we were chasing Rommel. I was down in South Africa for a couple of weeks a few years ago, but I'm pretty much out of it for most of the whole continent. What the hell does that have to do with anything—particularly with my being dragged here?"

"That's where this thing began, Mr. Walters," said Alicia Rivera. She had been waiting for them on the patio, calmly sunbathing. She was about thirty-five years old, attractive in a tan skirt and sleeveless blouse. Her bare legs were tanned, and the open sandals had been bought—Merle would have bet money on it—at a street stall down in Georgetown.

He had expected advanced electronics, not garden parties. Avant Systems seemed more mysterious then ever. He blinked his eyes, waiting for her to continue.

"We—Earl and I—were involved in consulting for the State Department," she went on. "We specialize in problems where sociology is important. I don't think I'm boasting if I say that we produced solutions that wouldn't come from anybody else." Her smile took away any suggestion of arrogance.

"What sort of problems? International?" Merle watched closely, but neither Brewster nor Rivera showed any particular reaction to his last word.

"Nothing on that big a scale. We deal with in-country development, usually when some conventional program hits an unexpected snag." She reached over to ring a bell on the table beside her. "What would you like to drink?"

A servant appeared through the French windows that led from the house to the patio.

"Bourbon. With soda and lots of ice," said Merle gruffly. If they planned anything really unpleasant it didn't seem

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likely to be poison. He studied his companions as they ordered their drinks. Alicia Rivera and Earl Brewster looked twenty years apart in age. How had they formed their business alliance?

She leaned closer to Merle, and he could smell a faint fragrance of jasmine.

"We're getting to something now that's not for disclosure," she said. "I should mention that we checked your clearances last week, and we have permission to give you the full story. We know you visited Cybercon. You want to know just what Avant Systems is doing. Correct?"

Merle nodded, as the drinks arrived on a tray that seemed to be expensive Waterford crystal. He was feeling a dangerous sense of disorientation. He had thought he knew what was going on—but that idea was evaporating in the pleasant autumn air. The sunny patio was like a make-believe world. Earl Brewster, with his long side whiskers, was the White Rabbit, and Alicia had to be Alice herself. But Merle still felt that strong prickle of alarm in the back of his skull. *Danger in Wonderland. Off with his head!* it said. He took a hefty pull of bourbon and soda and rubbed at the back of his neck.

"You said earlier that you were State Department. I won't go into details, but my clearances are in other areas."

"We know." Brewster had been brought a vile-looking yellow drink, to Merle's non-connoisseur's eye indistinguishable from a urine specimen.

"After a couple of jobs our reputation spread a bit," went on Brewster. "Last year we were asked to do work for a different agency. This country has been losing influence in parts of East Africa. None of the traditional methods to combat Communist takeover had worked, and we were asked if we had any ideas. Cheers."

He took a swallow of his drink. His mouth puckered, and Merle returned with relief to his bourbon and soda.

"We had one idea," said Brewster. "The leaders over there had this thing called 'Telling Beads.' Polished stones, a couple of inches across. The chiefs asked them questions—supposed to have the souls of their ancestors inside them—and the answers come back as slight changes to the colors of the stones. Mind you, only the chiefs seemed able to see the changes, but no one complained about that. The beads look like this."

He fished a smooth oval stone out of his jacket pocket and handed it to Merle, who turned it around in his hand.

"Lighter than it looks," he said. He put it down on the table, took out his reading glasses, and held it for a closer look. "Seems to me more like some kind of hard plastic. Not stone at all." He looked up.

Brewster smiled, a broad, relaxed smile. "Smart man. What you are holding is an Avant Systems' Telling Bead. Patent applied for. Plastic, and a damned sight better than the original. You see, the chiefs used to ask for *favors* as well as answers. For rain, or a big food crop, or a cure for gout or pains in the gut. And we could deliver the goods."

Merle looked again at the smooth oval. "There's a miniature receiver and transmitter in here, I suppose?"

"Of course. The chiefs made requests. The local operators for the Agency took it from there. You'd be

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surprised what you can do with a little cloud seeding, or pesticide and fertilizer sprays. We treated the chiefs' food with antibiotics and steroids, too, when it was necessary. After a few months, no chief would spit without checking with the Bead—and we made sure the color changes of *our* Beads could be seen by anybody who wanted to look."

Merle nodded. "Neat."

"We thought so too," said Alicia Rivera. "We thought we had it made. Then we ran into a problem *back here*, of all places."

"We were very naive," said Earl Brewster. "We had no idea how much infighting goes on in Government agencies."

Even while part of him stood aloof from the meeting and worried, Merle found himself admiring the skill with which those two passed the ball to each other.

"Some other part of the agency was trying to shoot holes in your work?" he said after a moment's thought.

Earl Brewster nodded his approval. Merle had come in on cue. "Blow it to pieces, more like. Somebody came up with a five-year projection showing that our work would have a long-term backlash; as soon as the natives became a bit more sophisticated they would reject the Beads' advice."

"Another group in the same Agency," said Alicia.

Unbidden, the servant had appeared to refill their glasses. Merle took a sip, and wondered if the difference in taste was just imagination. A trickle of perspiration was running inside his collar.

"You found an answer?" he said.

"We had to." Alicia was watching him closely. "We decided to prove that sophistication wasn't the issue—that technologically advanced people would accept Telling Beads, too, if the thing did a good job for them. And they wouldn't worry *why* they worked, so long as they did."

"I see the way you're going," said Merle. "The Predictor. But I don't see how you work it. Our lab didn't find any outgoing signals from the Predictor."

"You wouldn't, unless you monitored continuously. The Predictor only transmits data entered by the user when it receives the correct coded *incoming* signal. The whole data transfer takes a couple of seconds." Brewster smiled. "Simple, eh?"

"But how did you predict the Market?" Merle had come to a decision. Now timing would be all-important. He let himself slump lower in his seat and narrowed his eyes a little against the sun. "You still have to make an accurate prediction."

Alicia leaned forward, watching him closely. "Easier than making it rain on schedule. We have access to a fair amount of capital. It's easy to move small company stocks around with just a little buying and selling over a few days. We didn't rely on predicting the Market. For selected stocks we could make the *Market* fit the *predictions*."

"We made our point," picked up Brewster. "If stocks go the way the Predictor says, U.S. executives will use it, just like the African chiefs. Our sponsor finally accepts that sophistication isn't an issue. Now we're in the process of closing down. After a while the Predictors will simply stop working—no-

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body will lose anything, and when we stop moving the Market around people will find they haven't made much either."

Merle nodded, making the movement slow and drowsy. He levered himself slowly to his feet.

"Too much whisky and soda for one afternoon," he said. "Can you point me at a bathroom?" He took a large mouthful of his drink.

"Here." After a moment's hesitation and a look at Alicia Rivera, Brewster led the way through the French windows and across the wide internal hallway that ran through the center of the house. He paused at a door. "All yours. We'll be back on the patio when you're through."

Merle went inside the bathroom and locked the door. He moved at once to the wash basin and spat out the mouthful of liquid he had been holding. He waited thirty seconds, then, sighing, he crouched over the toilet bowl and forced himself to vomit—as silently as he could. The effort made his heart pound hard, and he was struck by a sudden incongruous thought. He had a dodgy heart. What a way it would be to die, bent over a toilet bowl and throwing up in a strange house. And then he would never be sure of the truth about Avant Systems!

He ran cold water over his hands for a while, then splashed his face with it. Back once more in the hallway, he found it deserted. He tiptoed along until he reached the front door of the house and eased it open.

Earl Brewster was standing just outside, flanked by the two servants. He nodded sternly at Merle.

"Hello again, Mr. Walters. You know, you're too sharp for your own good."

"What do you mean—"

"Don't bother to say it. You're wasting your time. We worked hard, Alicia and I, and we put on a good show. But we were sure you weren't buying it." He stepped inside the house. "Come on, let's go upstairs. There was a fair dose of barbituates in your last drink. Better be comfortable when you fall asleep."

The room was small, and like the rest of the upstairs of the house it was minimally furnished. Merle lay down on the bed and stared out of the window at the coming dusk. His stomach hurt, but he was wide awake.

What now? Alicia Rivera's final words before he fell into simulated sleep were intended to be reassuring—if he were willing to believe them.

"Four days, Mr. Walters," she had said. "That's what we need to make things tidy. Relax. You may get a bit bored here, but you won't be harmed. You can spare the time—so don't try to be a hero. You're too old for it, and I hope you're too smart."

They had put him up on the third floor, and the house sat at the top of a hill. His room looked out over a fair part of Georgetown, with the Potomac dimly visible in the distance. But there was no easy way of descent, even for a trained athlete. For a one-armed man the idea was preposterous. The door was bolted from the outside, and it was of solid hardwood.

Merle lay there in gloomy thought. For all the good he was doing he might as well be lying in drugged sleep. At

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every step he had been behind Brewster and Rivera. They must have had him under observation from his first contacts with Cybercon. He had a small two-way radio in his briefcase, something that Tolly wanted to use on an experimental basis; but of course that had been taken away, along with his watch, calculator, reading glasses, and everything in his pockets. So much for help from high technology. They had even taken his shoes. The only thing he had in his favor was that they now believed him to be unconscious.

Almost dark outside. A fine, clear evening. Merle had given up on new ideas. He could think of only a long shot, but it was that or nothing. And it was now or never.

He stood up, went to the window and raised the blind all the way. Then he went to stand by the door, and began.

"So who was behind it? That's the key question."

Merle shook his head. "Tolly, if I knew that you'd be the first to hear it. Our Government people won't get much from Earl Brewster and Alicia Rivera, I'll bet my pension on it. They're probably the smoothest con team I've ever seen, but I think they were in it strictly for the money. Hired talent. I bet they don't even know where the Predictor was manufactured—neither one of them has much technical knowledge."

They were again in Merle's dingily-furnished office, and Merle was sipping cautiously on a weak bourbon and soda. His stomach still felt sore from vomiting, and after being up all night he was hugely overtired, but he was in high spirits.

"We've run all the Predictors to earth," he went on. "And they're just where you'd expect them to be, considering what their real use was—in little companies that have some unique idea for lead-edge technology."

Tolly Suomi nodded. "You asked me the hypothetical question years ago. *If the wars of the future will be mainly economic wars, what will a weapons test look like?* But we never had an answer until now. And speaking of technology, Alex Burns has a little something—"

"—And I'll bet it could have worked," said Merle thoughtfully. He was too tired to be a good listener, but not quite ready to admit defeat and go off the bed. He took a larger swig from his glass, and a look of immense satisfaction came over his face. "It's totally logical, once you've seen it. Country X knows from its own research that some area is really promising, but the USA isn't up to speed yet in that field. And Country X doesn't want us there. So it plants Predictors in the right little companies over here, and they work. After a while that tempts the company to over-investment and financial exposure. One of two things happens: the company goes broke, or at the very least it can be acquired cheaply and its research efforts controlled. Either way, the line of development is slowed or stifled, or channeled the way that Country X wants to see it going. It might only lead to a thin technological edge, but that edge makes all the difference for international competition."

"It *would* have worked." Suomi took a bundle of papers up from the desk. "These make it clear that the pilot test

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was over. A few more days, and Earl Brewster and Alicia Rivera would have gone. If you hadn't told us where you were . . .''

Merle grunted. ''You know, that's the only annoying part of this whole thing. We're dealing with a highly advanced technology—in fact the only thing that tipped me off in the first place is that the gadget was just *too advanced*—''

''By the way,'' interrupted Suomi again. His face had a curious expression on it. ''Regarding technology, Alex Burns will be here in a few minutes—''

''—Too advanced to be built with today's hardware and software,'' went on Merle. ''That was the giveaway, and their big mistake.'' He eased back in his chair, closed his eyes, and allowed himself the luxury of rambling on. ''Too much faith in the mystique of high technology, that's what they had. There's the irony of it, when you think of how I told you where I was. I had to behave like a human fossil, and send the damned message in Morse code. Good thing I'm so old, or I'd never have remembered it. Talk about a triumph of *low* technology. I'm telling you, when I stood by the light switch in that room, flicking it on and off to send a Morse message and hoping it would get to you, I would have bet everything I own that nobody would notice. Seven hours I stood there, feeling like an idiot. The best I hoped for was a Boy Scout who might tell his dad. Having a retired Navy commander see it was simple blind luck. Well, I guess we drink to low technology.''

He opened his eyes and raised his glass. Then he lowered it suddenly as a tall, sandy-haired man entered the room.

''Alex! I didn't realize you were in town.''

''You've been too hyper or too tired for me to get through to you,'' said Tolly Suomi. ''I told you twice in the last ten minutes.''

''That so? Well, I'm glad to see Alex any time.'' Merle shook hands with the other man. ''Come on, have a drink. Tolly won't touch it at this hour. How's it going in the lab?''

''Very well.'' Alex Burns coughed, and his clear Inverness voice took on a slightly embarrassed tone. ''Extremely well. That's why I'm here. I'm sorry to say that Charlie Kirkwood and I gave you some bad information recently.''

''Bad information?'' Merle frowned. ''What about?''

''Chip technology and special software. We need refresher courses. They've both been going faster than we realized in some areas.''

He reached into his pocket and pulled out a thin black box. He handed it to Merle, who looked at it in a bemused way.

''The West Coast office just finished this yesterday,'' went on Alex Burns. ''And we flew it in Federal Express. It's our version of the Avant Systems' device you showed me. It contains a very good Stock Market model, and it seems to do about what their equipment did—may even be better. I expect that once a production line is established, for a little less than a thousand dollars we can make . . .''

Alex Burns paused and looked uncertainly at Tolly Suomi. Merle Walters

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was still staring fixedly at the equipment in his hand. His mouth was open.

"Come on." Tolly took Alex Burns by the arm and steered him toward the door. "We can talk about this tomorrow, Alex," he said. "Just now Merle's exhausted. Overdosed on technology. I think he could use a little solitude." ■

ON GAMING

(Continued from page 177)

bined immediately and overwhelmed the Ophiuchis.

Yet another alien race, the Rigelians, was encountered in the year 2244. The Terrans were defeated by carriers full of small, fast strikefighters. Then the Rigelians turned on the Khanate and likewise dealt the Khan a major blow when they ambushed his fleet. A brief truce allowed the Khanate and Terrans to combine forces. Armed with their own carriers and strikefighters, the allied fleet gradually wore down the Rigelians in the Third Interstellar War.

There are 20 different scenarios provided in *Starfire* which simulate the three wars between the four races. Some of the scenarios are small battles with one ship per side and can be played in 15 to 30 minutes; others involve large fleets and can take an entire evening to resolve.

The rules are not as long or as complex as might first appear from the length of the rules booklet. Less than ten pages of rules need to be digested in order to play the First and Second Interstellar War scenarios. An additional five pages of rules incorporates the strikefighters and optional tactics, such as ramming. The remaining 17 pages list the scenarios, designer's notes, player's notes, and indices for the rules.

One of the main differences between *Star Fleet Battles* and the simpler *Starfire* games is the method of keeping track of damage. In *Star Fleet Battles,* a detailed display of each ship's systems (engines, shields, weapons, etc.) is shown on a sheet with boxes representing each system. As damage is taken, the boxes are checked off until a system is destroyed.

In *Starfire,* on the other hand, each ship has a line of letters, which from left to right represent shields (S), armor (A), ion engines (I), etc. Thus, if a ship has three units of shields, this would be shown: SSS. As damage is taken, you check off a letter from left to right, moving through the shields, the armor, and into the vital systems of the ship.

If you're looking for something as challenging as *Star Fleet Battles,* but not as complex, *Starfire* is a very good alternative. The story line is interesting, the combat fast and furious. *Starfire* is the first of a series that can be strongly recommended to those who enjoy tactical space combat games. ■

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the reference library

By Tom Easton

The Golden Grove, Nancy Kress, Bluejay, $13.95, 256 pp.
The Door into Shadow, Diane Duane, Bluejay, $7.95 (trade paper), $40.00 (collector's hardcover), 320 pp.
Hit or Myth, Robert Asprin, Starblaze/Donning, $6.95, 127 pp.
Alien Debt, F. M. Busby, Bantam, $2.75, 240 pp.
The Last Master, Gordon R. Dickson, TOR, $2.95, 318 pp.
The End of the Empire, Alexis A. Gilliland, Ballantine/Del Rey, $2.25, 170 pp.
The Forlorn Hope, David Drake, TOR, $2.95, 318 pp.
One Winter in Eden, Michael Bishop, Arkham, $13.95, 273 pp.
The Best from Universe, Terry Carr, ed., Doubleday, $11.95, 211 pp.
Wonder's Child: My Life in Science Fiction, Jack Williamson, Bluejay, $15.95 ($40.00 collector's, signed), 288 pp.
Men, Martians and Machines, Eric Frank Russell, Crown, $7.95, 216 pp.
The Joy Makers, James Gunn, Crown, $7.95, 213 pp.
The Shores of Another Sea, Chad Oliver, Crown, $7.95, 214 pp.
The Classic Philip José Farmer, 1952–1964, P. J. Farmer, Crown, $7.95, 215 pp.

Earlier this month, I spent a few hours at Boskone XXI to speak on "Science Fiction in the *National Enquirer*," which went over very well. Topic and audience combined to put 300 people in hysterics for an hour, and I wish the fellow who volunteered to program the first computer psychic would get in touch with me. I never did get his name, and I want to write and encourage him. If he can do the trick, I'm sure he can get national exposure in the pages of . . .

I also sat on a reviewers' and critics' panel, but that wasn't nearly as much fun. And I met a few authors, including two whose latest books sit before me right now. Nancy Kress and Diane Duane are lovely, cheery, friendly la-

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dies, and their books are worth reading.

Nancy Kress's is **The Golden Grove.** In it, she contrasts nature and technology, rigidity and flow, reality and myth. The grove rests on a solitary island, centered on an odd stone in whose pores spiders breed and grow, filled with an aura of glory. The spiders' webs are fine and strong, and the local residents color them with additives to the dewdrops the spiders drink. They then harvest the webs and weave them into remarkable silks.

Yet all is not well. The grove is ailing, its aura fading, the webs growing flawed. Arachne, mistress of the island, is obsessed with finding a cure in potions. Her brother, Jaen, seeks a different cure in civilized Thera. As the grove dies, Arachne's obsession deepens. Jaen leaves the island, returns with Theran traders, and threatens violence to gain permission to uproot the spider stone and take it off for scholars to examine.

And all is futile. Nature heals in its own good time, but nothing can be the same ever again. Events force the reinterpretation of history and the casting aside of all but one obsession—and that one survivor is a madness.

Am I cryptic? Then so be it. I don't want to give away too much, but I do want to tease you into reading a remarkable take-off from—not a retelling of—one of the more intriguing Greek myths. Nancy Kress has done an excellent job, and the result is not entirely fantasy. Her explanation of the spider stone, if not of the grove's aura, gives her tale a science fiction feel.

Diane Duane's **The Door into Shadow** is the second volume in the tetralogy that began with *Door into Fire*. It too is a fantasy with SF elements, as in the description of dragons leaving a home world about to be engulfed by its sun's red giant stage to fly through space, guided by precognition, to find a new home. How do they fly? They manipulate the basic forces of the cosmos.

Yet dragons are only part of the story, albeit a crucial one. The protagonist is Segnbora, a swordswoman and a sorceress who cannot focus her flame. She accompanies Freelorn, the exiled prince of Arlen, and Herewiss, the world's only man to master the fires of sorcery. With them is Sunspark, a fire elemental who loves Freelorn and takes the guise of a horse for his riding. Later in the tale, they are joined by Eftgan, queen of Darthen.

This crew faces the Sauronesque embodiment of evil, the Shadow, its minions, the savage Reavers, and treachery in the usurper of Arlen's throne. To charge their reservoirs of power, they seek the Morrow-Fane, and there Segnbora is invaded by the soul of a dragon. It is the habit of dragons, you see, to pass their souls on to others of their kind at the moment of death, thus achieving a sort of immortality, but for this dragon there are no others near. There is only Segnbora, and she must become the repository of a thousand generations of dragon personality, wisdom, and power. As we might expect, the human-dragon blend that results is crucial to the ultimate victory.

Duane spends less time in *Shadow* than in *Fire* on the bisexuality of her people and on other aspects of their culture. Her focus is more on plot, action, and drama, and in those terms she succeeds. Yet it does help to remember *Fire*; without such a memory, her lands and peoples seem strange and unexplained, and the reader feels lost. It has been long enough since *Fire*, too, that she might have been well advised to recapitulate a bit more for those whose memories have faded.

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But let the quibbles pass. She has done a fine job and produced an entertaining book. And Jim Frenkel's Bluejay Books—whose review copies have been coming thick and fast for the last few months—is off to a grand start.

Among other things, Robert Asprin has been writing the delightful Mythadventure series, beginning with *Another Fine Myth*, continuing with *Myth Conceptions* and *Myth Directions*, and now reaching **Hit or Myth.** If you've been following the series—and you should have been—you know the basic scheme. Young Skeeve, cast adrift among the dimensions, becomes the apprentice of the Pervect (*not* a Pervert) wizard Aahz, who has lost his powers but retains his native cunning and a Dimension-Hopper. He meets Deveels, who look like . . . guess what? He meets a troll and his trollop sister. He acquires a dragon. He gets into jams and out of them, thanks to a back-handed knack for magic and lots of luck. He gains a reputation as a wizard of power, and more trouble comes looking for him.

In *Hit or Myth*, Aahz leaves Skeeve on his own, and the boy must face the interdimensional Mafia on his own. He manages much as usual, treating the reader to a host of puns, japes, wisecracks, and slapsticks in the process, and winds up with a mansion whose back door opens on the sequel. It's hard to tell what Asprin's next title will be, but we can guess at *Myth Steps*.

Asprin isn't trying to be profound. He's having fun, much in the vein of the old *Unknown*: cock-eyed premises, rigorously pursued. You'll have fun too, so buy the book. Buy the whole series.

F. M. Busby's **The Alien Debt** is one more in the Rissa Kerguelen Future History, following by some years the events of *Rissa* and *Star Rebel*. By now, Earth's corporate tyranny has been defeated. Bran Tregare and Rissa, and their daughter Lisele, are off to help the alien Shrakken in a war against the Tsa. The war's causes are mysterious, for the Tsa seem merciless killers, attacking with telepathic weapons without warning. But, Busby shows us, the Tsa do indeed have their motivation, quite a reasonable one once it is understood, and his people manage both to end the war and find a position as intermediaries between the alien species.

Much of the tale's drama comes from the long interlude of shipwreck and survival that sees Lisele growing up. The confrontations with the Tsa are weak and melodramatic by comparison, and the key scene, when Lisele finds the necessary answer to the conflict, seems mawkish rather than touching, as I imagine Busby intended it.

Alien Debt is better than its predecessors, and quite good enough, but I did not find it entirely satisfying. You may agree with me or not, but I suspect you will find the book an intriguing sequel either way. Busby is developing his future history neatly. Future developments will be worth following.

Gordon Dickson's **The Last Master** is minor Dickson. Hero Etter Ho, motivated by his brother's brain damage and death, opts to take the RIV treatment which will probably increase his intelligence a little, just might raise him to the level of the rare R-Master, and might make him join his brother. He hits the jackpot, finds himself in the engulfing arms of an exploitative system, and promptly rebels. He is suspicious. He digs. He finds clues that there are less risky versions of the treatment, suppressed for reasons of the rulers' own. He finds himself in league with an underground, and he arranges an un-

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derground victory. Along the way, his perambulations reveal a world built on pervasive welfare, where only a few contribute labor or ideas and are "valuable" to society. It is a world of stasis, and he will shake it up.

Like *Debt*, *Master* is not entirely satisfying, but for different reasons. Here, the reader senses that the author is manipulating his characters ruthlessly. Dickson has a point to make, and he does not allow his story to interfere with that point. The didacticism shows.

Having finally escaped his Rosinante trilogy, Alexis Gilliland has found **The End of the Empire.** The Empire is the Holy Human Empire, and it is toppling to revolution. The seat of government, royalty and military remnants and all, is fleeing Portales, and with it goes Colonel Saloman Thibalt Karff, the outlander security chief distrusted because he is not "one of us." Yet Karff is competent and loyal, and when the fleeing fleet reaches the isolated colony of Malusia, he is the one to lead the mission to evaluate the locals with an eye to establishing a base from which to resist the pursuing Rebels.

Malusia's society is highly stratified, with its elite dwelling in space habitats and its ruck in the muck on the ground below. A space elevator links the two domains and serves as the bottleneck essential to control.

Karff and his crew successfully gain a toehold. But before they can accomplish their mission, the Rebels arrive and the fleet must run once more. Karff et al. are abandoned to resist the Rebels as best they can. This means stimulating the locals into change, and supplying technology to match the invaders'. In the end, Malusia seems well set to remain independent, its stratification and snobbery ready to loosen. The new Rebel empire faces a threat it may not be able to survive, for it too is built on exclusion. What Karff brings to Malusia is the very antithesis of empire. Yet there is tragedy, too. Karff must suffer the fate of prophets throughout history.

Look back at the Rosinante books. Gilliland is a libertarian writer, for his point is consistently freedom from too-controlling governments, personal rather than institutional integrity and independence. It's a stance that allows good yarns, as the opposite one can rarely do, and it has much to recommend it.

David Drake favors the same view of life and art, but in **The Forlorn Hope,** he expresses it in an awesome sea of gore. Colonel Guido Fasolini's band of mercenaries has been helping the government of Czech-speaking Cecach against Republican enemies motivated by the most ardent of religious zeals. When the Republicans overrun their position, their employers betray them to the enemy, and they must fend for themselves, blowing away everyone who stands in their way.

Both governments are despicable, their will expressed by chaplain-commissars and morality police. Only the mercenaries and the few Cecachs who join their foredoomed cause are noble. The issues are stark black and white, awash in red, drowned in the sizzles of lasers and the blasts of bombs. The bit players, even among the mercenaries, are crude fellows given to such things as raping their fellow soldiers—or trying to; the gals bite—and rolling in hot coals. The main characters are insufferably heroic. And the action moves

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at a breakneck pace.

Drake can write. There's no doubt about that. But Oh! He loves the gore. If you don't, pass this one up.

Arkham House continues to bring out good collections. The latest is Michael Bishop's **One Winter in Eden,** with a foreword by Tom Disch and a dozen stories, some very potent indeed. The title story concerns a grade-school teacher who is really a dragon in disguise, and who simply cannot stand the bestiality of humans. Just as ironic in a different way is "Seasons of Belief," a horror story about a horror story about the grither, who whenever he hears his name spoken aloud leaves his Arctic lair to come and stop the speaker. There is also "The Yukio Mishima Cultural Association of Kudzu Valley, Georgia," in which a town of born-again culture fanatics commits mass seppuku on the post-office lawn. Or try "The Quickening," in which some unnamed force shuffles the human deck, transplanting everyone willy-nilly to foreign lands; languages no longer work, culture and economy collapse, and a new order riseth. And more. Bishop has a fine and literary hand, and you should not miss this sampling of his work.

The Best from Universe is Terry Carr's own selection of favorites from ten volumes of his fine original anthology. He repeats for us Silverberg's "Good News from the Vatican," in which a robot becomes Pope; Lafferty's "Nor Limestone Islands," about the blindness of preconceptions; Ellison's "On the Downhill Side," about New Orleans ghosts and second chances; Le Guin's "Schrödinger's Cat," queerly wry with a twist; Wolfe's "The Death of Doctor Island," concerning large-scale automated therapy; Pangborn's "The Night Wind," after-the-bomb love in a small town; Leiber's "A Rite of Spring," in which number theory comes alive to grand effect; Varley's well-known sex-change yarn, "Options"; and Waldrop's prize-winning "The Ugly Chickens." Every one deserves superlatives, and therefore so does the book. Buy it.

Jack Williamson's autobiography is **Wonder's Child: My Life in Science Fiction.** The title is apt, for Williamson seems by his own account to have retained the capacity for wonder, which so many lose in childhood. He shows this capacity in his late education and in his continuing delight in scientific and technological progress, and he charms the reader with periodic digressions on what has most fascinated him over the years.

Between digressions, Williamson retails his life from birth in 1908 to today. His family was very American in its diverse roots and in its constant thrust toward whatever frontier was most lately open. Williamson expressed that thrust in his own way when he discovered science fiction, and he dedicated himself almost monomaniacally to our field. It was not until he was 50 that he completed his college and graduate education, when some of the monomania had faded into perspective and—perhaps coincidentally—SF was having tough times. Earlier, it may have been that same monomania that gave him the difficulties leading him into psychoanaly-

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sis, and he tells us carefully of the way his analysis meshed with *Darker than You Think*.

Williamson is not terribly self-revealing. He is a private person, and he keeps a large part of his privacy even in his autobiography. Yet he reveals enough to make an illuminating story, of interest to readers and writers alike. We could use more such books from other survivors in the field. How would Heinlein's autobiography sell?

Crown has now inaugurated the Classics of Modern Science Fiction series, and Crown editor Jake Goldberg writes that the series will last "as long as there are good books to reprint. Judging from the wealth of uncollected stories, out of print paperbacks and hardcovers, Crown will probably be publishing Classics of Modern Science Fiction long after 2010."

And that is an admirably ambitious commitment. What kind of a start is it off to? I have the first four volumes of the series in front of me. The first is Eric Frank Russell's **Men, Martians and Machines,** first published in 1958. It's a witty space adventure in which humans and chess-nut Martians get in and out of trouble around the galaxy. A classic? Maybe not, but it's still good enough to deserve reprinting, and the price is certainly right at $7.95 for a small hardcover.

The second volume in the series is James Gunn's **The Joy Makers,** which saw magazine publication in 1954 and 1955 and appeared as a book in 1961. It deals with a rugged individualist's attempt to liberate the bored sybarites of Earth from the machines that tend them.

Third is Chad Oliver's **The Shores of Another Sea** (1971). In it, an anthropologist studying baboons finds that an alien has arrived and is using the baboons to study him.

Fourth is **The Classic Philip José Farmer, 1952–1964,** half a dozen of the stories that gave Farmer his reputation as a taboo-buster.

All four have forewords by Isaac Asimov. The Farmer has an introduction by Martin H. Greenberg; the others' introductions are by series editor George Zebrowski. The best of the books may be the Oliver, for Oliver's style seems to have weathered the years rather better (though his story *is* the youngest). All four have uniform bindings and jackets and thus promise a uniquely homogeneous shelf for your library. ■

● In the Middle Ages, they used to think disease was caused by possession by demons, frequently by swallowing them or otherwise letting them enter one's body. Today, we know that disease is really caused by ingesting germs and viruses or otherwise letting them enter one's body. And they say there's no progress!

Kelvin Throop III

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The Too-Inclusive "We"

(continued from page 10)

to view the normal course of history as an alternation of periods of peace and war, but anthropologists have long known that there are other cultures in which even temporary peace is inconceivable—and still others in which *war* is inconceivable. Interestingly, members of all those cultures tend to believe the same myopic fallacy that we (the "local" we) do: that what is seen as normal in *their* culture is characteristic of humanity at large. Eskimos and the Mission Indians of California, for example, simply couldn't swallow what early European or American visitors told them about war.

It seems that the causes of war lie at least as much in the structures of societies as in the make-up of individuals, and that societies *can* be structured in ways which make war far less likely. It also seems that anyone who sees nothing of human nature but his own culture's version of it is doomed to a very limited view of its potentials. If he is locked into a cultural track which sees war as normal and inevitable, no matter how much he may talk of wishing it would go away, he is unlikely to be able to imagine ways to make it do so. To see possibilities beyond trivial variations of the course his own culture is already on, he needs to see working examples of other possibilities. It may well be that, for our long-term welfare and even survival, one of the most important studies for all children to be exposed to is cultural anthropology. At present, almost *no* children in our culture get any significant exposure to that. But if that could change, so might the number of non-warlike people who allow themselves to be lumped into a *we* that does not describe them. And that might lead in turn to a wide recognition that there are enough of *them* to demand some real say about the future conduct of history.

We—humankind—are *not* in danger of racial suicide. We *are* in danger, but suicide is a totally inappropriate word to describe it. Treating it as if it *were* appropriate leads to a too-ready resignation to things that are not inevitable. If the human species is bombed into extinction (and that is possible, though perhaps not as likely as some suppose), a typical filing clerk or subsistence farmer or retired grandmother will be no more guilty of suicide than if someone broke into his home and stabbed him as he slept. If the human species is bombed into extinction, it will be not suicide, but *murder* of many individuals by a few. It will not be "us" doing to ourselves, but *them* doing to us. True, many (if not all) of them will claim to be at most unwilling accomplices to the crime. That claim may even have some merit, at least occasionally—but it should be subjected to at least as skeptical a scrutiny as it would in any criminal court.

If enough people in enough countries could change the orientation of their thinking just that much—to keep straight just who is doing what to whom, and to stop accepting guilt which they have not personally earned—it could make an enormous difference in what they demand of their politicians.

And who knows where *that* might lead? ■

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Like all the ships Loki flew, Erasmus Chang's scout *Praise of Folly* was too old. She went into or out of hyperdrive with a jolt that twisted a man's guts, her air recycler wheezed, and she had a 5% waver in her pseudogravity, so Chang's weight went through a seven-kilo cycle every twenty minutes.

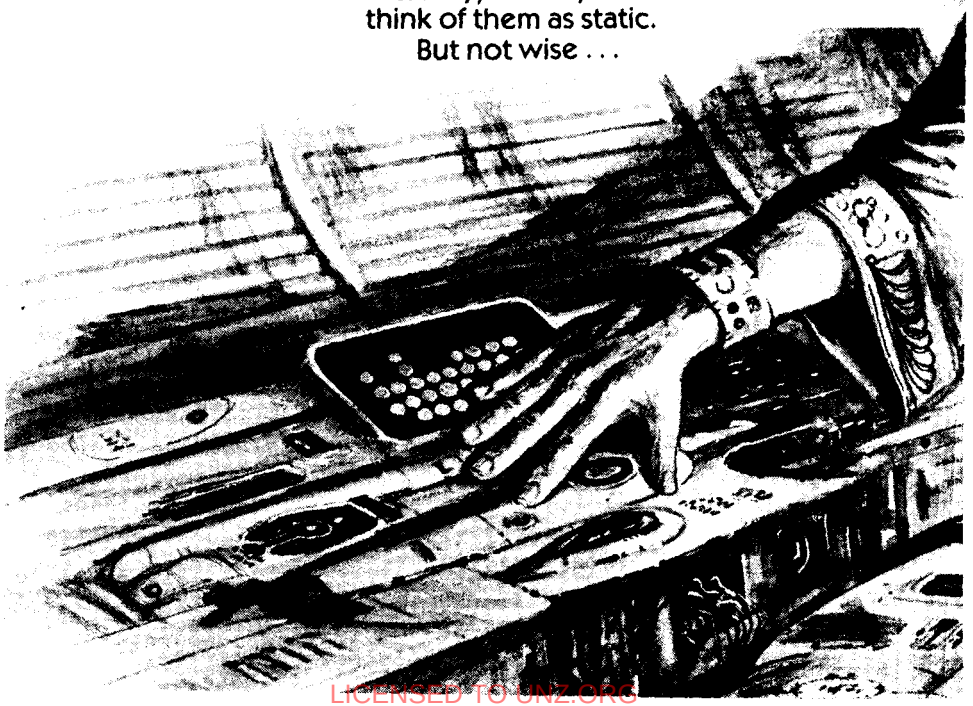
The computer was old, too. In a way, that was an advantage: the navigation data programmed in were Terran Confederacy, the most far-reaching set even if it was six hundred years out of date. But after enough time, memory dumps or no, a computer will develop a personality of its own—the current flows get set. Chang did not trust his machine very far. It was as cynically underhanded as he was.

"Well, hero, they're still gaining," it said with what he thought was misplaced amusement.

"I can see that for myself, thanks," he growled. He paced up and down the cabin, a lean, trim man a bit below middle height whose wide, high-cheekboned face was framed by a thin fringe of black beard.

Pace as he would, though, his eyes kept coming back to the hyperdrive detector. There was little enough else to see; with the drive on, none of the normal-space instruments worked. The four glowing points in the detector display were Zanat warships. One he might have challenged. Taking on four was sure suicide, and he could not afford it. Loki and all the worlds in human space

When things are in the habit of changing slowly, it's easy to think of them as static. But not wise . . .



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Doug Chaffee

Eric G. Iverson

HERBIG–HARO

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needed to know about the Zanat.

Unfortunately, they would overtake him long before he could deliver the news—long before he got out of the Orion Nebula, for that matter.

He punched for a sandwich, ate it. When he looked at the FTL display again, the four warships had slid a little closer.

"I wish I'd chosen a different bar," he said.

"You aren't the only one," the computer told him.

As soon as the shavetail lieutenant had stepped into the London Pub, Chang knew his leave was doomed. The youngster was in uniform, which meant he was on duty, and Chang was the only Service man in the dive. Just my luck, he thought sourly: run a successful mission and not get the chance to celebrate.

The load of books, cassettes, and floppies he'd snaked out of the cathedral on Cienfuegos deserved celebrating, too. Old floppies especially were more precious than gold. Even the Cienfuegans remembered that much; they'd mounted the discs above the altar, by the statues of their gods.

The scout pilot was still fuming when the lieutenant brought him back to Salvage Service Central. B'kila thought it was very funny. "Where did he find you? The London Pub or Nadia's?"

"The London Pub," Chang sighed. That his habits were known did not surprise him; he would have been surprised had it been otherwise.

B'kila looked him over, cocked a critical eyebrow. "That's not much of a beard, either."

The scout pilot put a defensive hand to his chin. He had grown the whiskers on Cienfuegos, to make himself less conspicuous there, and was proud of them. In spite of his name, he had enough caucasoid genes to let him raise a fair crop. "The day you start telling me how to wear my hair, you old harridan, is the day I get out of the Service."

B'kila laughed out loud, a bad sign; things that amused her generally meant trouble for other people. She was a plump black woman with straight, graying hair, the head of what was euphemistically known as the Loki Salvage Service. Loki's few friends called the Service a band of scavengers. Everyone else started with names like pirates, thieves, spies, and went downhill from there.

Having wasted enough time on pointless chatter, B'kila waved Chang to a chair by the big holo tank that took up most of one wall. He sat with the same feeling he had whenever he was in her office—that of being in the center of a spiderweb, watching the spider at work. Being on the same side helped only a little.

"What's gone wrong?" he asked bluntly, sure she would not have recalled him without pressing reason. Operatives got their chance to roister between missions.

She punched a button on her desk. The holo tank sprang to life with a view of that small chunk of the galaxy humans had touched. Stars with planets that were thought from any source, however ancient, to have been settled by men were shown in blue; those about which Loki actually knew something flashed on and off. Red marked the suns

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of nonhuman species that used the hyperdrive, yellow those of planetbound races. Most others were omitted; the white points here and there were stars with absolute magnitudes bright enough to make them useful nav checks over many light years.

She moved a vernier, touched another control. One of the winking blue points flared brighter for a moment. "Cienfuegos," she said unnecessarily. "I've listened to your report. A good run."

"Thanks." He waited. The compliment was another danger signal. Anything she had to get around to by easy stages was bound to be dicey—not for her, of course. For him.

His suspicion was confirmed when four brilliant orange points sprang to life beyond the glowing mist of the Orion Nebula, which dimmed to show their location more clearly. She said, "As well as I can judge, those spots mark where we've lost ships in the past two years."

"That's impossible," Chang blurted. "There are no human worlds out there." Loki itself was two hundred light-years Terraward from the Nebula, and hardly any blue points lay between it and the great cloud of gas.

"Impossible is not a word used to describe what's already happened," B'kila said in mild reproof, as though to a student who should do better.

"But—" Chang's protest died unspoken. B'kila knew the obvious as well as he. Starships in hyperdrive flew blind, of course; there was always the chance of returning to normal space coincident with solid matter. It was a very long one, though. Aliens might have worked up a trick good enough to snare one ship, he thought, but hardly four, not with the technological lead humans had—and especially humans from a planet like Loki, which still kept most of the skills of the dead Confederacy. That left . . . nothing he could see.

B'kila spoke with seeming irrelevance: "Do you know 'The Road Not Taken,' a poem by a Middle English writer named Frost?"

"Never heard of it."

"You might look up a modern translation when you leave. This Frost person could have been looking a hundred years into his own future."

The galactic map disappeared from the holo tank. A scratchy flat image replaced it: a crowded city scene, with swarms of humans in strange clothes, both civilian and military, milling about at a cautious distance from a starship of a make Chang did not recognize: a pretty crude one, he thought.

"This is Tokyo—the first Roxolani landing on Terra; it might just as well be Cairo, New York, Moscow, Shanghai, or twenty others. A.D. 2039," B'kila said softly. Seeing that the archaic date meant nothing to Chang, she added, "45 pre-Confederacy."

He whistled. No wonder the video was scratchy—it was over twelve hundred years old. He wondered how many times it had been rerecorded.

In the picture, the ship's ramp was lowering. "You can imagine the Terrans' anxiety," B'kila said dryly. "They'd been radioing the Roxolani since the fleet came out of hyperdrive in the solar system." Chang nodded. Naturally, they had gotten no reply.

Out came the Roxolani, a platoon of

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stout, furry humanoids in high-crowned helmets and steel corselets. They moved with the precision of veteran troops, shaking themselves into a skirmish line. At a shouted command from an officer wearing scarlet ribbons on his arm and fancy plumes, they raised their weapons to their shoulders and fired into the Terrans.

Chang heard the ancient screams. Undoubtedly the man holding the video set ducked for his life, for the picture jerked and twisted, but the scout pilot saw the clouds of black-powder smoke float into the sky.

The Terran soldiers around the starship returned fire automatically, opening up with small arms, rocket and grenade launchers, and recoilless shells from the armored fighting vehicle that had somehow squeezed into position close by.

When the video straightened, the starship was holed and all but two of the aliens down. The survivors gaped at their fallen comrades. Neither had made the slightest move to reload his musket. Reading nonhumans' body language was always tricky, but Chang knew stunned horror when he saw it.

" 'The Road Not Taken,' " B'kila murmured. "Back then, on Terra, they *knew* FTL travel was impossible forever. It was a rude shock when they found that a couple of simple experiments could have given them the key to contragrav and the hyperdrive three, four, even five centuries earlier."

"How *did* they miss them?" Chang asked.

"No idea—in hindsight they're obvious enough. What's that race that flew bronze ships because they couldn't smelt iron? And every species we know that reached what the old Terrans would have called a seventeenth-century technological level did what was needed —except us.

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"But trying to explain contragrav and the hyperdrive skews an unsophisticated, developing physics out of shape. With attention focused on them, too, work on other things, like electricity and atomics, never gets started. And those have much broader applications—the others are only really good for moving things from here to there in a hurry."

With a chuckle, Chang said, "We must have seemed like angry gods when we finally got the hyperdrive and burst off Terra. Radar, radio, computers, fission and fusion—no wonder we spent the next two hundred years conquering."

"No wonder at all," B'kila agreed soberly. "But the Confederacy grew too fast and got too big to administer, even with all the technology we had. And unity didn't last forever. None of our neighbors could hurt us, but we did a fine job on ourselves. Someone back then wrote that it was only sporting for humans to fight humans; no one else gave any competition."

"And so, the Collapse," Chang said.

"And here we are, on Loki and a few other worlds, picking over the pieces, a scrap from here, fragment from there, and one day we'll have the puzzle together again—or maybe a new shape, better than the one before . . . if we get the time. But those four missing ships frighten me."

That was a word Chang had never heard her use before. "I still don't see how they disappeared. There's no one out there."

"No one we know of," B'kila corrected. "But I keep thinking that a road traveled once might be traveled twice." As he took her meaning, Chang felt the little hairs at the nape of his neck trying to stand up. She finished low and fierce. "Find out what happened. *And come back.*"

"Any other little favors you'd like?" *Praise of Folly*'s computer had demanded when Chang described the mission. "Shall I write the suicide note, too? I won't go, I tell you—I'd end up in the scrapper there just as much as you."

"Shall I shift into override mode?" Chang snapped, in no mood for backtalk.

"No, don't," the computer said with poor grace. "It always leaves me slow and stupid for a couple of days afterwards."

Surly was a better word, the scout pilot thought, but held his peace. The takeoff was as smooth as takeoffs under contragrav always were, the shift into hyperdrive as brutal as the others *Praise of Folly* had been making lately. Chang staggered into the head and threw up. When he came out, he asked plaintively, "Isn't there any way to smooth that out?"

"Of course," the computer said. "Get me the parts and—"

Chang grunted. Loki's own yards turned out decent craft, but some techniques of precision manufacture had yet to be rediscovered. If one of the old Confederacy ships went wrong, repairs weren't likely to do much good.

Despite *Praise of Folly*'s tape library, travel under hyperdrive was dull. The computer played chess at a setting that let Chang win about half the time, until one day he escaped from a trap it thought he shouldn't have seen. Then

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it trounced him six times running, adding insult to injury by moving the instant he took his finger off a piece. After that it seemed satisfied, and went back to a level mere mortals could match.

From time to time other ships showed on the detector. Most of them never sensed *Praise of Folly;* Confederacy instrumentation handily outranged nonhuman or post-Collapse gear. Once, though, two vessels made a chase of it. "Damned pirates," Chang growled, and outran them.

He approached his planned emergence-point obliquely, not wanting any observers to track his course back to Loki. The jolt on leaving hyperdrive was not as bad as the one entering it —quite.

"Now what?" the computer said.

The viewscreen showed a totally unfamiliar configuration of stars. Even the Orion Nebula was not as Chang knew it, for he was seeing the side opposite the one it presented to human space. He shrugged. "Make for the nearest main-sequence G or K," he said, and gagged as *Praise of Folly* returned to hyperdrive.

The first yellow-orange sun proved without habitable planets. So did the second and third. A lean region, Chang thought. He was on his way to the fourth when the detector picked up the alien squadron.

Excitement and alarm coursed through him. From the brilliance of the blips on the screen, those were sizable ships. They were making good speed, too, far better than most of the nonhuman craft he knew. He held his course and waited to be noticed.

In short order he was; the strangers had sensitive detectors. Three vessels peeled off from the main group toward him. He took no evasive action; he was looking for contact. "Fool that I am," he said to no one in particular.

The lead ship's drive field touched his; they were both thrown back into normal space. Gulping, Chang wondered whether the aliens were subject to nausea.

The two ships emerged on divergent vectors several thousand kilometers apart. That would have been enough to make it impossible for most of the aliens the scout pilot knew to find him in the vastness of space, but the stranger swiftly altered course and came after him.

"I'm picking up radar," the computer reported.

"Wonderful," Chang said morosely. As usual, B'kila had been right.

The other two ships must have slaved their engines to their detector screens, for they returned to normal space at the same instant as their comrade and *Praise of Folly*. Chang's radar soon found them. They closed rapidly.

"Radio traffic," the computer said. The whistles and growls that came out of the speaker sprang from no human throat.

"Let's give them something to think about." Chang recorded his name and the name of his ship. "Squirt that out on their frequency."

There were several seconds of absolute silence, then a burst of alien noise that sounded much more excited than the previous signals. Chang wondered if the nonhumans had learned English or Low Mandarin from any of the earlier pilots. If so, they were not letting on.

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The incomprehensible babble continued.

Then alarms hooted and the computer was shouting, "Missile away!" A moment later it reported, "Contragrav job, fairly good velocity, but a clean miss —trajectory far ahead of us."

"Just the one launch?" the scout pilot asked tensely.

"So far." *Praise of Folly* was a confirmed pessimist.

"Might be a shot across our—" A new star bloomed in the forward screen, a supernova burst that went from white through yellow and orange to red and slowly guttered out.

"Fission explosion," the computer said matter-of-factly. "Thirty kilotonne range."

Chang held his head in his hands. Not just electronics, then: the aliens had a grasp of nuclear physics, too. He could not imagine anything worse.

"It lit up these," *Praise of Folly* said. Another screen came on, its images grainy with high magnification. The scout pilot did not recognize the craft displayed, but he knew warships when he saw them. They bristled with launchers and also sported two turrets each: quick-fire guns for close-in work, he guessed.

He weighed his options. Even winning a standup fight would not give him enough information to make B'kila happy. Meekly stopping, though, stuck in his craw. "They may as well be as worried as I am," he decided. "Give the lead ship a peewee at about the same distance they put theirs—but throttle down the missile so theirs seems to outperform it." He did not intend to show all his cards.

Atomic fire blossomed again, unmistakably brilliant. The gabble of alien noise rose to a roar. Then abrupt silence fell; it must have occurred to one of the nonhumans that Chang might somehow know their language. Cat and mouse, he thought, with neither side sure which was which.

The three alien ships approached one another, though not so close that a single blast could take out more than one. Boats flitted back and forth: a meeting, no doubt. Glad he was a loner, Chang went to sleep. In case of serious attack, the computer would have to defend *Praise of Folly* anyway.

The computer woke him a couple of hours later to report that one of the aliens had gone into hyperdrive. "Which one?" he asked. The smallest of the three appeared onscreen for a moment.

A boat left one of the remaining aliens and moved slowly toward *Praise of Folly*. Unlike its parent craft, it blazed with lights: the equivalent of a flag of truce? Chang could not affort to be trusting. "If it comes inside 2000 kilometers, fire another warning shot," he said. "Chemical explosion this time, not nuclear."

But the boat stopped at more than twice that distance. It retreated to its own ship, leaving behind a small metal canister made conspicuous by a floodlight and radar beacon. "Playing it very cozy, aren't they?" Chang said.

"Probably booby-trapped."

"Probably," he agreed. "Shall we find out? Send the probe over for a look."

The little robot sped toward the canister. The scout pilot wondered what the nonhumans would make of it. It would

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tell them something of the technology he had, but he hoped to learn more about theirs.

The light on the canister was incandescent, not a plasma tube; the battery pack that powered it was larger than the Terran equivalent. The canister itself looked suspiciously like a wastebasket. A foil cover had been taped across the top; the paper tape was already beginning to come loose as its adhesive dried in vacuum.

At Chang's direction, the probe peeled back the foil. Nothing untoward happened. The camera pickup showed that inside the canister there were only two rectangular sheets of thick, parchment-like paper, one perfect, the other with a ragged edge, as if it had been torn from a book.

The book page had a line of incomprehensible script, but a black-and-white print took up most of the surface: an irregular pattern of lines and spaces. The scout pilot was used to seing them in color, but he recognized it at once. "Spectrogram!" He had an inspiration. "Match it against the sun their fleet was heading for."

After a few seconds, the computer said, "It checks." Chang fancied that he heard a note of puzzled respect in the electronic voice. He hid a smile. The computer was smarter than he was, but it did not make intuitive leaps.

The other sheet proved that the aliens were used to contacting other races. A series of skillful cartoons instructed Chang to go into hyperdrive between the two nonhuman ships and let them pace him to the star. They also warned that he would be attacked if he dropped into normal space on his own; he was to let one of the aliens bring him back by cutting across his drive field.

"Sensible enough precautions," he said. "They'll have scrambled every warship in that system to look out for me as I emerge, too. I would, in their shoes."

For *Praise of Folly*, the jump into hyperdrive was smooth. Chang's escorts hovered close, just far enough away to let their fields operate. To his regret, they kept up when he increased speed. Though the rest of their skills seemed a bit behind those of the Terrans, their hyperdrive systems were first-rate.

Shortly before he expected to return to normal space, the scout pilot gritted his teeth and injected himself with several cc's of memory-RNA. For the next ten days to two weeks he would have nearly total recall—and a raging headache.

Like Terrans, the aliens preferred to emerge well away from a system's ecliptic plane, to minimize the risk of encountering sky junk. Chang listened torpidly as radio traffic crackled back and forth between his escort and the ships that, as he had guessed, were standing by awaiting his arrival.

Several formed up in a globe around him. Another message canister showed him that he was to stay in the center of the formation as they approached the system's second planet. "If it weren't for the honor of the thing, I'd rather walk," he grumbled; reading Frost had gotten him interested in other ancient authors.

The lead ship in the escorting array slowed until it was only a couple of kilometers ahead of *Praise of Folly* and

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began flashing its lights on and off. After a minute or so, the scout pilot understood. "Folly, if you will."

"So it is," the computer said, but went after the alien in spite of his slip of the tongue.

Spaceports on civilized worlds have a depressing sameness; it is next to impossible to make vast expanses of concrete interesting. The perimeter buildings, though, caught Chang's eye when *Praise of Folly* dipped below the last cloudback; they had the massive look of fortifications.

Atmospheric flyers screamed overhead as *Praise of Folly* touched down near the center of the field. Gun-carrying armored vehicles that reminded Chang of the ones he had seen in B'kila's ancient tape rumbled toward the ship.

There were also footsoldiers running across the concrete. Chang turned up the magnification on his vision screen. The aliens were fairly humanoid, taller and thinner than Terrans, with knees that bent in the opposite direction. They had narrow, foxlike faces, long jaws, and blunt carnivore teeth. Thick reddish-yellow hair covered most of their bodies; they went nude except for boots, belts with bulging pouches, and helmets.

Their hand-weapons gave the scout pilot a momentary start. The guns' curved magazines remined him of the Kalashnikovs that were still ubiquitous in human space. He quickly saw, though, that it was only coincidence; the rest of the design was not similar at all.

He checked the atmosphere analysis. The air seemed good enough, barring some noxious oxides of nitrogen and sulfides that probably came for the noisy, smokebelching iron monsters out there. He didn't worry about diseases. Few alien germs found humans tasty, and his broad-spectrum immunity shots left him doubly safe.

After instructing the computer, he strapped on a siderarm and cycled through the airlock. The pistol meant nothing as a weapon against the firepower out there, but no race with an organized military could fail to grasp what it represented.

The worst moment came as the outer airlock door swung open. If one of the aliens panicked or got trigger-happy, B'kila would have five missing scouts to brief the next pilot about.

Some of the aliens yelled when Chang came into sight. "Officers, it would appear," the computer said into a receiver implanted behind his ear. "Notice the stripes on their helmets." Seeing one of them knock a soldier's gun aside, Chang tentatively identified his first phrase in the alien language: "Hold your fire!"

For a moment he thought his weight was shifting, then realized it was the opposite: like a seaman rolling on land, he had become so used to *Praise of Folly*'s pulsing generator that steady gravity felt odd.

After the ship's mechanically pure air, the unidentifiable spicy smells of growing things hit him like wine. He did not even mind the diesel stink mixed with them, though it made him cough.

He paced off a circle of about ten meters around *Praise of Folly*, made pushing motions to show that the troopers should keep their distance. When a

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squad arrogantly strode inside his perimeter, *Praise of Folly* let go with an ear-splitting siren screech. Machine guns swiveled to bear on the aliens. They scrambled back.

Chang smiled to himself. It would not hurt to have the aliens think the ship still manned. In a way, it was.

One of the nonhumans stepped out of a small group and came forward, ostentatiously stopping at the boundary line Chang had set. The scout pilot caught his musky body odor; who could say what he smelled like to the other?

The alien—an officer of some rank, by the five stripes on his helmet—pointed to himself and said, "Zan." He pointed at one of the soldiers behind him. "Zan." Another. "Zan." A wave that encompassed a dozen or more. "Zanat."

The language lesson went from there. Chang soon decided that the Zanat officer was a trained contact specialist. He went about his business with a calm competence that implied he had undertaken such tasks many times before. Skillfully he gave Chang both vocabulary and grammatical structure. The latter made the scout pilot want to groan, for the Zanat language was highly synthetic. Chang wished for the simpler analytic structure of Low Mandarin or English, but he had been on enough worlds that spoke Russian-based tongues to cope. And what he learned, he did not forget.

The contact officer's name was Liosh; that, at least, was as close as Chang could come to it. His own name sounded like "Razmuzjang" in the other's mouth. Liosh undid his belt, tugged off his boots, put his helmet on the tarmac. When completely naked, he pointed to himself, then to *Praise of Folly*'s entry ladder. His mobile ears twitched in what Chang had already come to recognize as the equivalent of a raised eyebrow. "Go there?"

"No." The scout pilot could not make his refusal polite.

Liosh gave a very human shrug. He pointed to one of the blocky structures several hundred meters away. "Go there, then?"

The scout pilot decided to risk it. He has several days' worth of food concentrates in the knapsack on his back, as well as vitamins to supplement alien food and reagents to test for the more common sorts of indigestible proteins and lipids. If the Zanat intended killing him, they had easier ways than poisoning.

He spoke into his handset, telling *Praise of Folly* what he was about and adding, "If I'm lost, get the data home if you can: override command. And another override: destroy yourself to avoid capture."

"Acknowledged," the computer said sulkily, speaking, as Chang had ordered, through both the receiver behind his ear and the handset. He wanted to make sure Liosh understood what that was; the Zanat model was a back-carried unit bigger than his knapsack, and looked to be much heavier.

Liosh, he suspected, was smart enough to draw his own conclusions from that.

After several tries, he conveyed to the Zanat that hell would break loose if he was not allowed to communicate with his ship regularly, or if they tried to seize it while he was gone. Liosh agreed so promptly that Chang was sure the aliens would take their chances when

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the time came. He shrugged; he had known that already.

Troopers fell in around him and Liosh as they walked toward the port building. When they were nearly there, Chang heard a spatter of small-arms fire: single shots, followed by the harsh *tac-tac-tac* of automatic weapons.

He whirled, but the gunshots had nothing to do with *Praise of Folly*. In fact, several of the armored vehicles were rumbling away from his ship toward the far edge of the spaceport. "What's going on there?" he asked the computer.

"Fighting." Sophisticated as it was, *Praise of Folly* could be annoyingly literal, especially just after an override command. A moment later, though, it added some worthwhile information: "The attackers stay well hidden, but do not seem to be Zanat."

"Interesting," Chang said. He turned to Liosh, used the only interrogative he had. "What?"

The contact officer spread his four-fingered hands in a gesture many races used. "Slayor," he said. "People of the world." He approached that several ways, until he saw that Chang understood. He did not have a high opinion of the Slayor. Pointing at a starship: "Slayor—no." At a fighting vehicle: "Slayor—no."

Local barbarians, the scout pilot translated mentally. Which meant that this was not the Zanat homeworld. He had not really thought it was, but the implications jarred him all the same. The Zanat were plainly here as conquerors, not traders—which argued for an expanisve, unified imperialism such as the dead Confederacy had known.

And if they found fragmented humanity unprepared . . . Their technology was not up to the best Terran standards, but not much in human space was either, any more. Chang wanted to run and hide.

Instead he followed Liosh into the port building. The door closed behind them with a thud that told of metal reinforcement. Liosh led him up a couple of flights of stairs and through a tangled set of corridors to a suite of rooms from which troopers were hauling desks, cabinets, and other office furniture. Others were standing by with gear that looked as though it had come from their barracks: a big metal footlocker, a table, a cot amazingly like Loki standard issue, and several peculiar free-standing contraptions that puzzled Chang until he realized they had to be what a race with back-acting knees used for chairs.

Liosh pointed at the gear and the rooms. "Yours," he said. Chang nodded, a gesture with which the Zan was already familiar. The scout pilot noted that, as befit a fortress, the windows were mere firing slits. Nor was he surprised to discover a guard-squad outside his door. He had been a prisoner ever since his ship emerged in this system.

He gained fluency in the Zanat language with a speed that won Liosh's respect. The alien contact officer pushed hard; he did not have the advantage of an artificially unfailing memory, but he owned a good one, and the Zanat seemed to need only about half as much sleep as Terrans. He found Chang's dormancy amusing.

The scout pilot came to like him, not least because he did not take himself too

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seriously. For all that, the Zan was a clever interrogator, adept at sliding smoothly from one subject to the next. One secret, though, he did not penetrate: the scout pilot was careful always to speak of the Confederacy in the present tense. He was so perfectly consistent that Liosh never thought to doubt him.

Still, it was not an easy time. Liosh extracted a good deal of information, and yielded little in return. Chang started seeing those probing golden eyes, started hearing that guttural voice in his sleep.

He dreamed they were trying to talk during a storm. Thunder boomed; lightning seared the sky. When he woke, for a long moment he was unsure he had. The night was pitch-black, but lurid flashes of light came stabbing into his chamber. The crashes that tore the air were louder and more continuous than those from any tempest.

He heard shouts through the turmoil: the harsh yells of the Zanat and different cries, high thin wails that rose and fell in weird ululation. The wails grew ever louder and ever closer.

The Zanat had not bothered to disarm him. He belted on his pistol, dashed to the window and looked out. Carbon arc lamps on tall poles spread a hellish blue glare over the spaceport tarmac; the shadows of the figures dashing across it were black and sharp as if cut from dies. Most moved with a sinuous grace the Zanat did not possess.

A machine gun chattered from a gun-pit, spitting flame. Running shapes toppled, one after another. A couple, Chang thought, were Zanat. Then the gun stopped—a jammed cartridge? A broken firing pin? The scout pilot had no way of knowing. Some of the graceful runners leaped into the pit. The machine gun stayed silent.

Crump! From the great cloud of smoke that shot up, it was a black-powder explosion, primitive but effective. An arc-light support tottered, swayed, fell with a heavy boom. A moment later another lamp was taken out, and a quarter of the field plunged into twilight.

The Slayor yowled in triumph. Not all of them toted only their native arms. A burst of half a dozen bullets thudded into the wall near Chang's window. He hurriedly pulled away. That had to be a captured gun.

Another explosion was followed by the iron clang of a starship smashing against concrete. Chang's gut clenched with fear. If *Praise of Folly* went down under the locals' attack, he was marooned as inevitably as if the Zanat smote her with a nuclear warhead.

The Zanat inside the spaceport buildings had not been taken entirely by surprise. The sentries were alert, and the species as a whole was not so sunk in sleep of nights as Terrans would have been. Alarms yammered. There were shouted orders in the next room, a tinkle of glass as a window was broken out, and a rattle of rifle fire. "That got a couple of the motherless *fargs!*" a trooper shouted.

But the Slayor must have been building their attack in secret for months, maybe years. They were throwing everything they had at the hated invaders from the stars. Somehow they had even hauled one of their clumsy field-pieces to the edge of the spaceport to oppose Zanat artillery. Back at his window, Chang saw the muzzleflash and

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belch of smoke. A solid shot smacked into the building.

The Zanat, though, had built to withstand a lot of that kind of pounding. And when the natives tried to force the stout door through which Chang had entered, they were bloodily repulsed. The Zanat raked their retreat with fire. The scout pilot thought the assault had been wrecked.

But it was only a diversion, to draw the enemy's attention while a squad of Slayor set a charge against the far side of the port building, lit a fuse, and fled.

The blast hurled Chang from his feet. He rolled into a tight protective ball. The floor lurched beneath him. The noise was stunning, a blow at the ears.

He staggered upright, dazed, half-deafened. Faintly, as if through roaring water, he heard injured Zanat screaming. The air was thick with the smell of smoke and blood. There were other screams too, of wild excitement. The Slayor were in the building.

The door burst open. Only wan auxiliary lights burned in the hallway, but they sufficed to show Liosh and a pair of soldiers with rifles. The contact officer was limping; someone had slapped a rough bandage on his lower leg.

"Come on!" Liosh barked at the scout pilot. "We'll get you away. We may not hold here, and you're too precious to leave for the savages to butcher."

Chang agreed with that, though for reasons very different from the Zan's. Yet being taken from the neighborhood of *Praise of Folly* was the last thing he wanted. When he hesitated, one of Liosh's troopers hefted his gun menacingly. He yielded.

Liosh made no concessions to his wound as he hurried through the maze of corridors, picking his way over rubble and corpses. Chang saw his first Slayor, dead, a slim, gray, hairless being still clutching a large musket. Neat bulletholes stitched its chest; the exit wounds chewed its back to red ghastliness.

The contact officer followed his eyes. "They are fools, brave fools but fools. They do not see they will be better off once we pacify them and bring them into our Sphere."

The Romans had sung that song in Gaul, Chang thought, and the British in India, and the Americans in Indochina, and the Confederacy on Epsilon Eridani I. Sometimes they turned out right in the end, sometimes not. Either way, a lot of people got killed finding out.

A live native poked its head round the corner, let out a yell, and charged. It was armed only with a rapier. A burst of fire from the Zanat chopped it down.

Behind them, a gun spoke, the dull report of Slayor powder. One of the troopers with Liosh pitched forward on his face. A squeal of agony said the local had not enjoyed its victory long. Liosh knelt, asked the wounded soldier a question too low for Chang to catch. The answer came in a choked grunt. Liosh drew a knife across the Zan's throat in a quick, practiced motion, touched the ears, eyes, and nose of the body in turn, then straightened and hurried on.

He led the remaining trooper and Chang to a door. "In here." When his companions were through, he dogged it shut behind them. "Now down, all the way." On the spiral stair his injury

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did trouble him. His thin, dark lips skinned back from his teeth as he forced the pace.

There were no Slayor in the sub basement, not yet. Even the auxiliary lights failed, though, as Chang emerged from the stairwell. Before he could think of escape, the two Zanat had electric torches out.

Liosh went ahead with such confidence that he hardly needed light. At last he came to the door he was seeking. "Escape tunnel," he explained to Chang, "in case of such embarrassments as this. I hope there's a vehicle left at the far end."

The passage was several hundred meters long, with only thin orange beams of light stabbing into the blackness ahead. Then the scout pilot smelled fresh air ahead, night-cool and moist. Liosh swarmed up a metal ladder. "You next," he called. Very conscious of the trooper's rifle at his back, Chang climbed.

A belt of thick, shrubby vegetation had hidden the vehicle park from the spaceport. Two or three pieces of heavy armor still sat there, squat and deadly, but most were already in the fight; their passage had flattened wide swathes of the native plant life.

Liosh ignored the behemoths, heading instead for lighter, swifter transport. A military historian would have called it an armored personnel carrier; Chang had seen similar machines on several human worlds.

The trooper scrambled into the driver's compartment. Liosh and Chang went round to the rear of the vehicle. The contact officer turned to open its double doors—and Chang, at last unwatched for an instant, drew his pistol and sapped the Zan behind the right ear.

Liosh fell bonelessly. The scout pilot raced back to the trooper, who was cursing as he tried to coax the machine's engine to life. The sight of the handgun froze him. "Out," Chang ordered. He clubbed the second alien into unconsciousness.

He paused for a moment over Liosh, pistol in hand. But shouts came echoing up from the mouth of the tunnel—and the Zan, after all, had been trying to save him. He turned and trotted toward the field. The smell of sap from crushed plants filled his nostrils.

He dug his handset from a pocket. "On my way!" he shouted.

"Took you long enough," *Praise of Folly* said tartly. "Things have been lively out here."

That, the scout pilot saw as he emerged from the undergrowth, was putting it mildly. Several armored vehicles blazed on the tarmac; they and the burning port buildings gave all the light there was.

Chang ran past corpses of Zanat and Slayor flung every which way in death, past wrecked spacecraft. He knew a moment's relief when he realized that *Praise of Folly* had been away from the worst of the fighting. Then a bullet whistled past his ear and another spanged viciously from concrete, and he realized that the greater distance did nothing for *his* safety.

Still, he was only one more shape moving through darkness, not likely to draw much fire and not a good target if he did. *Praise of Folly* stood tall a couple of hundred meters ahead.

He did not spy the Slayor until almost too late. The local slashed at him with

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a sword—no rapier this, but a great two-handed claymore. The blow went wide. Chang fired at point-blank range, and also missed. He threw his pistol in the native's face. The Slayor went down, keening. Chang did not look back. He flew up *Praise of Folly*'s boarding ladder three rungs at a time.

"Out of here!" he bawled the instant the airlock doors were sealed behind him. "They have more things to worry about now than us."

Praise of Folly outran the missiles that came streaking after her, sped toward free space. Chang whooped and punched for champagne.

His glee proved short-lived, for the Zanat spacecraft in orbital patrol were more alert than the distracted planetary forces. The radio crackled with challenges, which he ignored. Radar and contragrav detector warned of ship-to-ship missiles, faster and more deadly than ground-based weapons.

"Take 'em out," Chang said, adding quickly, "Chemical warheads only. One day soon we'll have to deal with these people, and I don't want to be remembered for screwing up a whole planet with an electromagnetic pulse from our atomics."

But he did not want to be shot out of the sky, either, and did not tell *Praise of Folly* to degrade its countermissiles' performance. With better sensors and stronger contragravs, they easily destroyed the attackers. Small puffs of red and gold flame blossomed astern.

Far sooner than most pilots would have dared, he went over to hyperdrive. He was so exhilarated that the surge was over before he remembered he should have been sick.

He gunned *Praise of Folly* for all the ship was worth, trying to get out of detector range before his pursuers went FTL. For most of an hour, he thought he'd done it. Then a point of light winked on in the detector display, far behind but indisputably there. He swore and shifted vectors. The enemy followed. He swore again. He had already seen that the Zanat had good FTL instrumentation.

"Just have to run them into the ground, then," he muttered.

But the bogey refused to disappear. After awhile, another crawled onto the edge of the screen, and then two more. All were prominent echoes, warcraft for certain.

He tried to console himself with the truism fallen back on by every captain in trouble since the days of ships on Terran seas: a stern chase is a long chase. But when he looked at the detectors, he saw that it would not be long enough.

It was several days later, ship's time, when he and the computer finished commiserating with each other over his poor choice of drinking establishments. By then his lead, almost a light-year when he set out, had melted to hardly more than half an AU. The Zanat ships were maneuvering into englobement formation: if they surrounded him and touched his drive field with all theirs at once, they and he would be thrown into normal space together, with all the odds in their favor in the ensuing slugging match.

"I'll have to go sublight myself first," he decided unwillingly: the last resort of an outmatched pilot. "Maybe,"

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he added without much belief, "they'll lose me." If the ploy would ever work, the Nebula was the place for it. Gas and dust could play merry hell with gadgetry.

"Any particularly thick patches close by?" he asked hopefully.

The computer was silent for nearly a minute while it searched its memory and added corrections for several centuries of proper motion. At last it said, "As it happens, yes. We're near a Herbig-Haro object."

"New one on me," the scout pilot admitted. "What is it?"

"A luminous nebula with a denser center that—"

"Say no more; that's exactly what we need. They'll have to have their engines linked to their detectors and drop out of hyperdrive the moment we do, or else overshoot and lose me for good. FTL, half an AU is nothing. Set our course so that when we and they break out, they'll be smack in the middle of that denser center." Chang let his optimism run wild. "One of them might even emerge coincident with a rock, and lower the odds. Can we fight three?"

"Not with our store of missiles depleted as it is," the computer answered at once. The scout pilot sighed. *Praise of Folly* went on, "Reconsider your plan. Herbig-Haro objects are—"

Chang was not about to be balked by mechanical mutiny. "Execute, and no chatter," he said harshly. "Override command."

The silence that fell had a reproachful quality to it. *Praise of Folly* changed course. Like hounds after a rabbit, the Zanat ships followed.

Chang's nails bit into his palms. His lead was a bare half-AU now, hardly seventy-five million kilometers. If this Herbig-Haro whatsit didn't show up soon, the Zanat would force him out of hyperdrive and fight on their own terms.

Praise of Folly gave a sudden, sickening lurch. Her normal-space instruments came back to life—and at that same instant, every alarm in the ship went off. Red lights flared, claxons hooted, bells jangled, a commotion to wake the dead.

Chang did not even notice it. His mouth hanging open, he was staring in disbelief at the viewscreens. "What the bleeding hell is a star doing there?" he said in something like a whispered scream.

A star it was, a crimson monster. *Praise of Folly* could hardly have been more than fifteen million kilometers from the edge of its chromosphere. Had Chang been on the surface of a planet at that distance, its great orb would have stretched across almost two-thirds of the sky.

He could peer deep through the tenuous gases of its outer atmosphere, could gauge the temperature of the swirling currents by their colors: here a ruby so deep the eye almost refused to register it, there a coruscating uprush of brighter, molten red. It was like looking down on a stormy ocean of flaming wine.

The sight held Chang fascinated until he absently wiped his hand across his forehead. It came away slick with sweat. As the alarms could not, that reminded him where he was. Another few seconds and he would cook, no matter how well-shielded the ship was. His finger jabbed the hyperdrive switch.

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The abused engines groaned, but the wrench that sent *Praise of Folly* FTL was the most welcome thing he had ever felt. The clamor of alarms faded away. Nothing whatever showed on the hyperdrive detector. Chang shivered. "One thing's certain, they never knew what hit 'em." Moths in a blowtorch—

He shivered again as reaction set in. That could have been him emerging in the center of a star . . . a star the computer had not known about. "You almost fried out both!" he howled.

There was no reply. He remembered his last command. "Override lifted," he said. "I want to hear what you have to say for yourself. Why did you think you were diving into a nebula instead of a star?"

"That should be obvious even to you," the computer said, testy as usual after an override. "When my navigation data was compiled, that star did not exist."

"Tell me another one," Chang snorted, "one I'll believe."

"Your ignorance is not my problem, except that it almost destroyed *Praise of Folly*, and you with it. You would not listen to my warning. As long ago as the end of the second century pre-Confederacy, astronomers knew that a Herbig-Haro object was the precursor to a star."

"You really mean it," the scout pilot said in wonder.

"Yes, I really do." The computer seemed determined to get its own back. "Why do you think a Herbig-Haro object is luminous? The energy emitted by the slowly condensing cloud in the center ionizes the gas around it and makes it glow.

"But when gravitational contraction brings the cloud down to about the size of Sol's system—say, eighty AU's across—something new happens. Some of the energy inside stops going into heating the gas of the cloud and starts breaking up hydrogen molecules and such in the center: things are beginning to get hot in there.

"And when that energy gets diverted, there isn't enough gas pressure left to support the outside of the cloud any more. It falls in on itself over the next half a standard year or so, until it shrinks to a diameter of about eight-tenths of an AU. Then the heat and pressure generated by the collapse restore equilibrium and the new star becomes visible, with a surface temperature of 4,000° K or so."

"Visible! I should say so." Chang would never forget that fierce red glare. "Why hasn't any survey since the old Confederacy come by and noticed it?"

"There isn't much human traffic out this way," *Praise of Folly* said with what sounded like an electronic shrug. "And no one on more traveled routes would have seen the star yet; its light simply hasn't traveled far enough. From its diameter and spectrum, it can hardly have been shining longer than twenty years."

"Twenty years," the scout pilot murmured. As the fear leached out of him, awe began to replace it, the awe of having been present at the biggest birth in recorded history.

"Shape direct course for home," he told *Praise of Folly*. "Now I have something to keep B'kila happy and the astrophysicists too." His expression

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suddenly went mercenary. "I wonder how much I can get for the tapes."

The air inside B'kila's sanctum was conditioned to the same temperature as every other part of Salvage Service Central, but always seemed five Celsius colder. "Incompetent," she was saying, "fumbling, harebrained, lucky—lucky twice, which is more than anyone deserves." She sounded annoyed that Chang had come back at all.

He grinned like an impudent schoolboy. "Who is it who teaches that nothing matters like results? And how do you like my results, O mentor mine?"

"I can find flaws there too," she said grimly. "These Zanat of yours will have to be reckoned with. From your tapes, I'd rate their technology at the level of mid-twentieth century Terra: say, 130 pre-Confederacy. There can't be more than a couple of hundred planets in human space that can match them, and no three of those trust a fourth, Loki sadly included. Now a whole united species knows where we are."

"They had a fair notion before I met them," Chang replied. "And we can hope they also have the idea we're a good people to stay away from. They took out our first scouts, yes, but from what Liosh said they had to work for it. Then they sent four good-sized warships after *Praise of Folly*, and lost every one."

"No thanks to you," B'kila said.

"Ah, but they don't know that. What can they think? Either *Praise of Folly* handled all four of their bigger ships by itself, or else everything I told them about the Confederacy was true, and I had reinforcements waiting. Neither prospect can appeal to them."

B'kila smiled thinly. "You didn't make a hash of that," she admitted. "By all odds, it was the best you did out of the whole mission."

"Well, not quite," Chang said. His tapes and records had sent the entire astronomy department of the Collegium of Loki into ecstasies, and fetched even more than he expected. He had plenty for a really first-class spree, to make up for the one B'kila had cheated him out of.

She was not through with him yet, though. "How do you read the Zanat? Do you really believe they'll avoid us, say by fortifying their Sphere to the eyebrows and waiting for trouble to find them, or will they come looking to see what went wrong. Honestly, now."

Chang's smile slowly disappeared. B'kila had a way of piercing to the heart of problems. The scout pilot had to answer, "I'm afraid they'll come looking."

"That was the impression your reports gave me," she nodded, "but firsthand experience and the feel it brings are worth more than all the reports ever recorded. It was important to have your judgement check mine."

B'kila doled out compliments sparingly. Flushed under the effects of this one, Chang ventured, "When Liosh was grilling me, I had the impression that you and he would have worked well together." He brought the notion out hesitantly; it half-pleased and half-disturbed him.

She did not turn a hair. "I think so too," she replied. "Yes, as a species they're quite a bit like us—altogether

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too much, as a matter of fact." She sighed and shook her head. "Interesting times, interesting times."

She turned away as if Chang was not there, spoke into her phone box: "Josip, Neelam, are you in place? It'll be plan two." The scout pilot took his leave; B'kila did not stand on ceremony, and often went straight from one piece of business to the next. She paid no attention to his departure.

Just outside Salvage Service Central, though, another of those curseworthy young lieutenants saluted and said, "Excuse me, sir, are you Master Pilot Chang? I'm Josip Broz; I'll be briefing you on your new assignment."

Chang's mind raced. As usual, B'kila was one step ahead of him, but this time he could see where she was going. "Interesting times" translated to "crisis," and he knew only too well what the crisis was. He also knew with sudden dreadful certainty that his leave was about to get canceled again.

Not without a fight, though. "Chang?" he said blandly. "No, he's an older fellow. I did see him in the lobby, if you're looking for him." As Josip Broz trustingly turned his back, the scout pilot bolted.

Lieutenant Neelam Sanjiva Reddy corraled him, of course, before he made a hundred meters. ■

IN TIMES TO COME

Tom Kidd's cover next month is for Colin Kapp's new novelette, "Something In the City." The city in question was, for practical purposes, dead, a victim of "clean" welfare. But those few who had to go there found it was not *quite* as dead as it seemed, but still harbored something invisible, active, and sinister.

The sinister thing in Colin Kapp's city has a perfectly reasonable explanation, of course, and there's a suspicion in some scientific circles that at least some "paranormal" phenomena do, too, even if the explanations are not yet fully understood. But sometimes things can be used before they can be fully described by theory, so Alan Vaughan's review of the current state of parapsychology research is appropriately titled, "Toward a Technology of Psi."

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brass tacks

Dear Dr. Schmidt:

The February issue was outanding, even by *Analog*'s exceptionally high standards. Margaret Bishop's article should be required reading for every parent of school-age children, and your own discussion of the so-called "soft sciences" is the most logical and succinct evaluation of the subject that I've ever had the pleasure to read.

"Free Enterprise" by Ben Bova is a brilliant (and painful) satire that you're to be commended for printing. As a manufacturing engineer who works extensively with Japanese machine tool builders and importers, I was able to find a name and a face in my own experience of nearly every one of Bova's characters. Although the cliché pictures of Japanese workers as tireless, infinitely loyal little automatons are wearing awfully thin in my mind (some of them were pretty flimsy to begin with), the basic theme of the story was right on target. I have to wonder why it wasn't listed under "Science Fact" in the table of contents.

KIRK GORDON

Redford, MI

Dear Dr. Schmidt:

Margaret Bishop's advocacy of the phonic approach to reading may be justified for remedial purposes and adult education, particularly where the student already speaks the language. I suspect that most of the controversy on this subject reflects a basic difference in goals. The "pattern recognition" (PR) partisan asserts (at least implicitly) that mere ability to read is not enough in modern society: children should learn to read *rapidly* and enthusiastically. It can be argued that a person who views the written word as the representation of sound(s) will tend to vocalize while reading (albeit inaudibly) and thereby

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be limited to oral data rates. Walking is better than crawling, but how much more satisfying it is to run!

PR reading *is* fast. It has other advantages too. Correct spelling becomes automatic: the words look right. Vocabulary expands painlessly: meanings are obvious from context and repetition. In a broader view of the pattern, punctuation, grammar, and sentence structure are easily grasped. Even the construction of a good paragraph becomes discernible with experience.

English abounds in phonetic anomalies. Is *read* pronounced "reed" or "red"? The answer comes only from context. We hear the wind in the trees, wind a watch, but wind a horn. Such examples multiply endlessly. It is rare, though, for a PR reader to mistake a *meaning* in context.

The question then becomes how to teach Johnny to read—rapidly. I don't recall how I acquired the skill, but I do know how my son learned. We read to him for 15–30 minutes a day, beginning when he began to talk. He apparently followed the text with his eyes. Questions about letters, words, and pronunciation were answered as they arose.

Most "beginners' books" are sterile stuff to an adult. We moved quickly to such works as the Pooh and Dr. Doolittle stories, *The Wind in the Willows*, *The Sword in the Stone*, *Treasure Island*, and *The Hobbit*. Midway through Book One of *The Lord of the Rings* my son corrected a reader who carelessly dropped a sentence. Soon thereafter he became bored with the pace of vocalized reading, finished the trilogy on his own, and reread it several times. His babysitter was also a Tolkien fan; they rehashed the story in appalling detail. Now, reading that trilogy with speed and comprehension is, plausibly, to be reading at the adult level. He was in second grade at the time! A high school senior now, he has read 4-5 books a week for as long as anyone can remember.

Obviously, the "golden window" for reading opens at an early age. It closes, alas, too soon. From high school days I speak a little idiomatic German and read it aloud tolerably, but my comprehension of either spoken or written German is poor. Practice should improve both, but it is unlikely that I could now learn to read that language in the PR mode. So far as French is concerned, which I studied perforce in graduate school, the less said the better! My son's experience with high school Spanish appears to be similar.

The conclusion follows inexorably: barring a genuine learning disability, it is parents who are to blame if Johnny can't read. Children can *and should* be basically literate when they enter school. If that became the norm, time would be freed for needed emphasis on the organization of content, writing style, etc. There would also be time to acquire facility with a foreign language before the golden window starts to close. That (to our shame) is something we cannot expect most parents in this country to do at home.

JAMES A. EYER

Dundee, NY

The Author Replies:

Mr. Eyer repeats all the articles of faith upon which ideographic reading instruction is based. The problem is that they are mere articles of faith.

First, there is nothing "mere" about the ability to read. Either this ability is acquired by learning how to use the alphabetic technology, or it is *not acquired at all*. Among the hundreds of totally or partially illiterate students I have seen in my 25 years of remedial teaching, every single one was in full

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possession of all the "pattern recognition" tricks taught in ideographic classrooms. But they could not read. The first patterns that need to be learned are those which connect letters with speech. Once these are mastered, all the larger patterns are easy to see and use.

Second, sub-vocalization is not slow. It is naturally rapid, as rapid as thought. Surely, Mr. Eyer is not opposed to thinking because it is conducted in sub-vocalized language, and is therefore too slow. How productive does he think it would be to read at a speed beyond the speed of thought? (In contemplating the joys of running, he should remember that one must first learn to walk.)

Third, reading attempted on the basis of ideographic pattern recognition without benefit of phonic mastery is not rapid. It is slow, painful and laborious. Context is little help because such readers make so many mistakes that they are almost always struggling to employ a context different from the one actually supplied by the author.

Fourth, the "mere" ability to read does not excise the natural sensitivity to context. It "merely" enables the reader to possess the context necessary to solve the identities of words like *read, wind, bow, left, ground,* etc., etc. (Take a *bow* or *bow* and arrow? Opposite of *right,* or past of leave? Earth, or part of *grind?*)

Fifth, "pattern readers" who do not understand phonic patterns are miserable spellers. They have only the vaguest notion of what a word should look like. They can often tell when they have a word right, but when it looks wrong, they have no notion of how to correct it.

Finally, there is a direct correlation between the amount of phonics students know and their ability to read and spell. No phonics: total illiteracy. A little phonics: functional illiteracy. Half-mastery of phonics: reluctant reading and agonizingly embarrassing spelling deficiencies. All this, among people who have completed 7th grade or more in the public schools.

The only actual fact which Mr. Eyer brings forward is the fact that he taught his son to read with phonics, reading to him early, and answering questions about letters, words, and pronunciation. Of course the boy became an excellent reader. He was taught *how* to use the *alphabet.*

But the 66,000,000 total and functional illiterates in this country who were mentioned in the recent TV show, "Can't Read, Can't Write" *cannot* teach their children to read. The schools, however, could do it if only they would teach children how the alphabet works.

MARGARET M. BISHOP

To the Editor:

Re the story, "Symphony for a Lost Traveler" in the March, 1984, issue. It seems that Kerel Mattias Ashendene is not only a very powerful corporate manager, but is also quite a celestial mechanic!

He seems to be able to unlock the Moon's rotation so that the Earth appears over his dome when Cimela first arrives, and then for the night of the dinner he rotates the Moon so the Earth is absent from the sky.

Now, if Ashendene's retreat was at the very edge of the near side of the Moon, the Earth would appear and disappear due to the libration of the Moon. But then the sentence, "Earth hung overhead, a brilliant sapphire suspended against midnight velvet studded with diamonds." could not be employed.

Despite this minor discrepancy, I enjoyed the plot, the imagery and the writ-

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ing style of the story very much.

T. G. SHEARER

Champaign, IL

Hm-m-m . . . that is a neat trick, isn't it?

Dear Dr. Schmidt,

You have been doing a marvelous job editing *Analog*. You are publishing extremely good stuff. I thought I should let you know that, but of course, that's not what I'm writing about. I am writing about a scientific error in the story "Rory" by Steven Gould. (April '84 issue.) In this story, as you may recall, some people in a free floating capsule in space need to change the orientation of their capsule and very logically do so by running around on the inner surface. That's fine. Then, however, they note that once they stop running, the capsule keeps spinning, and rather than do the work of braking it by running in the opposite direction, they find a way of making things work out with a spinning capsule (they fire the improvised jets only at those moments when the capsule is pointing the right way.) That's wrong. When the people stop running their own deceleration will be counterbalanced by a deceleration of the capsule, which will stop spinning. It would only continue to spin as long as they continue to run. It is easy to understand why this should be, since it is an immediate consequence of the conservation of angular momentum, one of the very most fundamental of the laws of physics (as I hardly need to tell you.) Still, you did let this error slip by you. It seems that conservation of momentum is a tricky point which people often get confused about even when they are quite conversant with the theory.

What is *really* interesting about this (at least to me) is that I have already had a letter published in an SF magazine, pointing out the precise same error in a different story! How about that? If you will check your office library and look into the letter column of the May 1978 issue of the now defunct but fondly remembered *Galaxy* magazine, you will find a letter from me, pointing out precisely this error in a story called "Jogging Up Main Street," which had been published in the November 1977 issue of *Galaxy*. J.J. Pierce was the editor at that time and points out in his editorial reply that not only had he missed that error, but that the story had originally been purchased by the previous editor of *Galaxy*, Jim Baen, who also failed to notice it. So, lots of SF editors have already been fooled; you are merely the latest.

In "Jogging Up Main Street" the entire plot hinged on this erroneous construction of orbital mechanics; in "Rory" it is entirely incidental, and the plot would have worked just as well without it. So if it is ever anthologized anywhere, it can be discretely re-edited. It is, in fact, an excellent story.

DAVID PALTER

Hollywood, CA

Oops, and O the embarassment! These things do slip by occasionally, even with people who should catch them—and the smaller their role in the story, the easier it can happen. But they still shouldn't. ■

● I have yet to see any problem, however complicated, which, when you looked at it the right way, did not become still more complicated.

Poul Anderson

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On Gaming

Dana Lombardy

The most popular tactical starship battle game is *Star Fleet Battles* by Task Force Games (reviewed in an earlier issue). But what many gamers may not realize is that the second most popular tactical starship game is also published by Task Force Games—*Starfire* ($12.95 at your local store, or direct from 1110 N. Fillmore, Amarillo, TX 79107).

Starfire was actually developed before *Star Fleet Battles,* and it was first released in two mini-game editions. Now it's been redesigned and released as a single boxed edition. *Starfire* has a totally different playing system, different ships and races, and different universe (story line) than *Star Fleet Battles.*

The universe of *Star Fleet Battles* is the familiar *Star Trek* adventure with the Federation, Klingons, Romulans, etc. *Starfire,* on the other hand, focuses on the Terran Interstellar Wars.

"Jump" points to other star systems were discovered in the year 2053, when the Earth probe ship *Hermes* accidentally "found" a warp path leading out of our galaxy by winking out of existence near Neptune and reappearing near Proxima Centauri. It wasn't long before the path was navigated by other Terran ships, and new warp points were found in the Alpha Centauri system. By the year 2205, Earth had major population centers, colonies, and small outposts on at least 88 different planets in various star systems.

At this point, we discovered we were not alone in the universe. The Terran starship *Discovery,* in a routine exploratory mission, was suddenly attacked by an alien ship near planet VX-134. The *Discovery* escaped, and with the data scanned from the alien vessel, the Terrans deduced they had bumped into an outpost at the edge of a "Khanate."

Quickly, research vessels were converted into warships. These makeshift craft opposed the Khanate ships that later appeared to attack the "intruders." The Terrans faired well in the first engagement, and captured aliens revealed their race to be the Khanate of Orion.

For the next seven years, battles raged near warp points as each side attempted to gain the upper hand. Both the Terrans and Khanate introduced new weapons and improved ships, but the end result of this arms race was a standoff. Finally, a border between the races was agreed upon, and an uneasy peace ensued.

All differences were put aside when a new alien race, the Ophiuchis, were encountered in 2225. While the First Interstellar War lasted seven years, the Second, between the Khanate and Terrans against the Ophiuchis, was over in less than a year. The lesson learned from the First war was that it was pointless to delay the decisive clash between the main battle fleets. The Khanate and Terran forces com-

(continued on page 144)

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a calendar of analog upcoming events

28-30 September
AD ASTRA IV (SF conference) at Howard Johnson's Airport Hotel, Toronto, Ontario. Guest of Honor—Dean Ing, Fan Guest of Honor—Bob Passovoy. Registration—CDN$12 through Labor Day, CDN$15 at the door. Info: Ad Astra IV, Box 7276, Station A, Toronto, Ontario, Canada M5W 1X9.

5-7 October
CONTRADICTION 4 (western NY SF conference) at John's Hotel, Niagara Falls, N.Y. Guest of Honor—Donald Kingsbury, Special Guest—Samuel R. Delany. The usual plus chocolate symposium and pigout. Registration—$9 until 21 July, $14 thereafter. Info: Contradiction, % Pepe, 147 Huntingdon Ave., Buffalo NY 14214.

8-9 October
IEEE-Franklin Institute Centennial Technical Convocation at Philadelphia, Penna. Info: Joseph Bordogna, School of Engineering & Applied Science, University of Pennsylvania, Philadelphia PA 19104. 215-243-7244.

8-10 October
ACM 1984 Annual Conference at San Francisco, Calif. Info: Karen A. Duncan, Health Information Systems, 15 Parons Way, Los Altos CA 94022. 415-948-3941.

12-14 October
WORLD FANTASY CONVENTION 1984 at the Westin Hotel, Ottawa, Ontario, Canada. Guest of Honor—Jane Yolen, Artist Guest of Honor—Jeff Jones, TM—Spider Robinson. Registration—$35 ($43 Canadian) attending, $12 ($15 Canadian) supporting. Info: World Fantasy Convention, P.O. Box 4911, Station E, Ottawa, Ontario, Canada K1S 5J1.

19-21 October
WESTERN RECON II (Intermountain SF conference) At Airport Hilton, Salt Lake City, Utah. Guests of Honor—Anne McCaffrey, Wendy and Richard Pini, Marion Zimmer Bradley. Special Guest TM—Paul Edwin Zimmer. Local Guest Author—James Tucker. Info: Western ReCon II, Box 510581, Salt Lake City UT 84151-0581.

22-26 August 1985
AUSSIECON II (43rd World Science Fiction Convention) at Southern Cross Hotel, Melbourne, Victoria, Australia. Guest of Honor—Gene Wolfe, Fan Guest of Honor—Ted White. Registration—A$30 until 31 December 1984 (supporting); A$50 until 31 December 1984 (attending). This is the SF universe's annual get-together. Professionals and readers from all over the world will be in attendance. Talks, panels, films, fancy dress competition, the works. Join now and get to nominate and vote for the Hugo awards and the John W. Campbell Award for Best New Writer. Info: Aussiecon Two, GPO Box 2253U, Melbourne VIC 3001, Australia (use airmail); Fred Patten, 11863 West Jefferson Blvd. #1, Culver city CA 90230 (membership info); jan howard finder, Box 428, Latham NY 12100.

30 August-2 September 1985
NASFiC 1985 (North American SF Convention, officially The First Occasional Lone Star SF Convention & Chili Cook-off) at the Hyatt Regency Austin and Palmer Auditorium, Austin, Texas. Guest of Honor—Jack Vance, Artist Guest of Honor—Richard Powers, Fan Guest of Honor—Joanne Burger, TM—Chad Oliver. Registration—attending $25 until 30 June 1984, supporting—$15. Info: NASFiC, Box 9612, Austin TX 78766.

—Anthony Lewis

Items for the Calendar should be sent to the Editorial Offices six months in advance of the event.

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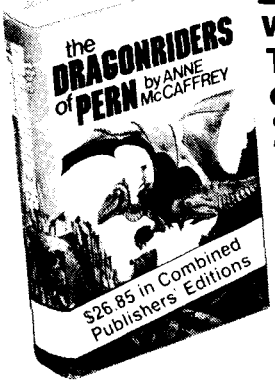

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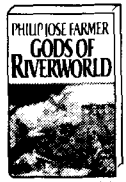

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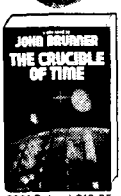

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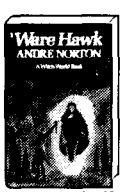

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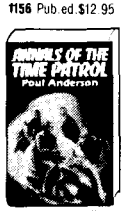

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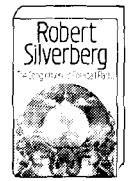

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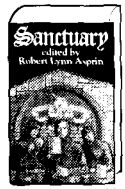

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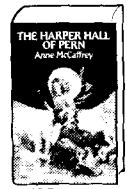

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